C I N T R A F O R

Working Paper 91

Niche Market Opportunities for Alaskan Forest Products in Japan

Ivan Eastin
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EXECUTIVE SUMMARY

Despite the poor economy in Japan, there remain promising niche markets for Alaskan softwood lumber. The unique characteristics of Alaskan softwood species are well suited to the demands of the Japanese market in general and Japanese post and beam home builders in particular. In addition, Alaskan species, particularly Sitka spruce and Alaska yellow cedar, enjoy a good reputation in Japan. For example, as a result of recent regulatory changes in the residential construction sector, it may be advantageous for Alaskan producers to supply kiln-dried lumber and glu-lam products milled to the specific dimensions required by the post and beam industry. Given that Alaskan producers cannot compete solely on the basis of price, a more effective strategy is to differentiate their products using non-price attributes that are valued in Japan. The primary aims of this research were to identify niche market opportunities for Alaskan timber species in the Japanese post and beam industry, describe those market opportunities and provide recommendations to help Alaskan sawmills evaluate the niche opportunities in Japan and objectively assess how those market opportunities match their own production and sales capabilities. The market opportunities in specific niche markets are described below.

RESIDENTIAL CONSTRUCTION

The Housing Quality Assurance Act of 2000 requires that all builders provide a 10 year warranty on their homes, including the structural components used to frame-in the house. This requirement has had a significant impact on the species of lumber specified for structural components that are used in ground contact applications. In the future, Japanese builders are expected to increase their use of naturally durable timber species in an effort to reduce their liability and increase the performance of their homes. A second factor influencing material specification in residential construction has been the homebuyers' increasing awareness of, and concern about, "sick house syndrome". Sick house syndrome has received extensive coverage within the Japanese media and, while it is primarily attributed to off-gassing of volatile organic compounds (VOC's) from carpeting, paint, and vinyl wall coverings and their adhesives, this concern on the part of some homebuyers has caused a growing number of builders to reduce or discontinue their use of engineered wood products and pressure treated wood. The combination of these two factors provides Alaskan sawmills with a unique opportunity to increase their sales of Alaska yellow cedar lumber in both the post and beam as well as the 2x4 segments in the home building industry.

LAMINA FOR GLUE-LAMINATED BEAMS

Currently there are six glu-lam beam manufacturers in Japan that utilize Alaska yellow cedar lumber to produce laminated *dodai* and posts. Alaska yellow cedar glu-lam ground sills tend to be used in higher end homes, although some builders of mid-price homes use yellow cedar glu-lam ground sills as a way of demonstrating the high quality of their houses and differentiating their homes from their competitors. In addition to ground sills, there are also opportunities to export lamstock produced from Sitka spruce and hemlock for use as posts and structural beams. This is particularly true because Alaskan timber species tend to be slow growth with narrower growth rings and correspondingly higher strength characteristics than the same species growing in other parts of the Pacific Northwest.

LUMBER FOR *SHOJI* COMPONENTS

Traditional Japanese homes typically have a *tatami* room. The *tatami* room may be where the family gathers or it may serve as a bedroom at night. *Tatami* rooms use a large volume of appearance grade wood in exposed applications such as beams, *shoji* screens, and moldings. While there are fewer *tatami* rooms being built in Japanese homes today, there is still a good demand for high quality yellow and red cedar, as well as Sitka spruce and white spruce, for *shoji* components. In addition, the price premiums obtained for *shoji* grade lumber make this a good market for lumber manufacturers.

This research has demonstrated that there are a number of potential market opportunities in Japan for softwood lumber from Alaska. These range from rough green lumber to planed and kiln-dried lumber to laminated yellow cedar sill plates (*dodai*). The most promising opportunities were found to be yellow cedar *dodai* for the post and beam market, 2x4 and 2x6 yellow cedar dimension lumber for sill plates in the 2x4 market, Alaska yellow cedar, Sitka spruce, and hemlock lamina for the laminated beam industry, and rough, green or planed, kiln-dried yellow cedar, western red cedar, Sitka spruce, and white spruce lumber for the *shoji* manufacturing industry. Having identified a series of market opportunities for softwood lumber from Alaska is not enough though. A more important factor is to provide sawmill managers in Alaska with a series of marketing recommendations that will allow them to objectively assess and determine if exporting softwood lumber to Japan makes strategic sense for their company and, perhaps more importantly, that will assist them in determining whether their company is prepared to make the commitment of time and resources that are critical to achieving success in the Japanese market. A series of ten strategic marketing recommendations developed during the course of this study are presented and discussed.

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1.0 INTRODUCTION

The ongoing economic downturn in Japan has seen residential housing starts drop from 1.64 million in 1996 to 1.17 million in 2001. The impact of the decline in Japanese housing starts on demand for US and Alaskan forest products has been dramatic. Japanese Customs statistics indicate that over the period 1996 to 2001, Alaskan log exports to Japan plummeted by 61.6%, from 1.23 million cubic meters to 474,000 cubic meters. While the Japanese recession has had a serious impact on the demand for Alaskan logs, the decline in Alaskan lumber exports to Japan can be traced back to 1990. This is demonstrated by the fact that Alaskan exports of lumber to Japan have experienced a precipitous decline since 1990, a trend that can be attributed to a combination of factors, including timber harvest restrictions in SE Alaska, attrition in the Alaskan sawmill industry, a decline in the competitiveness of Alaskan lumber, as well as the economic malaise in Japan. Over the period of 1990-2001, Alaskan lumber exports to Japan declined by 99.8%, falling from 437,382 cubic meters to just 856 cubic meters.

Despite these trends, there remain promising niche markets for Alaskan softwood lumber. The unique characteristics of Alaskan softwood species are well suited to the demands of the Japanese market in general and Japanese post and beam homebuilders in particular. In addition, Alaskan species, particularly Sitka spruce and Alaska yellow cedar, enjoy a good reputation in Japan. Recent market research in Japan suggests that there are two distinct market opportunities for Alaskan wood products in Japan: 1) commodity markets for structural lumber and 2) specialty niche markets for value-added products.

With the exception of baby squares (square posts that are used to frame the walls of a post and beam house), the post and beam industry remains largely untapped by North American firms, who prefer to focus on supplying standardized commodity items into Japan. Alaskan producers may be able to offset their higher production and transportation costs by supplying high-quality specialty products into the post and beam market. For example, as a result of recent regulatory changes in the residential construction sector, it may be advantageous for Alaskan producers to supply kiln-dried lumber and glue-laminated (glu-lam) products milled to the specific dimensions required by the post and beam industry. Most US sawmills, which produce lumber in standard rather than metric lengths, are ignoring this larger segment of the Japanese housing market. On the other hand, Canadian and European lumber exporters have made significant inroads into the Japanese post and beam market by supplying products that meet Japanese needs. Given that Alaskan producers cannot compete solely on the basis of price, a more effective strategy is to differentiate their products using non-price attributes that are valued in Japan.

The primary aims of this research were to identify niche market opportunities for Alaskan timber species in the Japanese post and beam industry, describe those market opportunities and provide recommendations to help Alaskan sawmills evaluate the niche opportunities in Japan, and objectively assess how those market opportunities match their own production and sales capabilities. The specific objectives of this research project are summarized below.

1.1 RESEARCH OBJECTIVES

1. Analyze the results of a survey of sawmills in SE Alaska to assess their ability to export wood products,

2. Describe factors that influence the decision to export wood products and affect the success of wood exporters,

3. Describe the regulatory factors driving technological change in the Japanese post and beam industry,

4. Characterize how and where individual species of timber are utilized in the post and beam construction system,

5. Characterize the factors that influence substitution between timber species by post and beam builders and pre-cut manufacturers,

6. Conduct a technical analysis of the niche markets, including specific technical requirements for wood products to include sizes, moisture content, surface condition, and grades, and

7. Identify niche market opportunities and recommend strategies for increasing the competitiveness of Alaskan forest products in these niche markets.

This report has been designed to provide sawmill operators and exporters in Alaska with information on the niche market opportunities in Japan. However, in order to provide the reader with a more detailed understanding of the Japanese housing market and the factors that affect the use and specification of wood in housing, the report begins by providing an overview of the residential construction market in Japan. The next section of the report provides a detailed discussion of the structural framework of post and beam houses as they are built in Japan. This discussion is followed by a description of the relationship between specific structural end-use applications and wood species. We also present a short estimation of the volume of wood used for each of the major end-use applications. The focus of the report then shifts to providing a detailed description of the four major market opportunities for Alaskan softwood lumber in Japan: residential construction (both post and beam and 2x4 homes), glue-laminated beams, and *shoji* components. The unique technical specifications for softwood lumber required within each of the niche markets are also presented in this section of the report. Having described the niche market opportunities in Japan, the report then moves to provide a general discussion of the sawmill industry in SE Alaska and some of the challenges and considerations confronting sawmill operators who might be considering exporting to Japan. Finally, the report provides a set of strategic marketing recommendations targeted to Alaskan sawmill operators who are interested in exporting their products to Japan.

2.0 AN OVERVIEW OF THE RESIDENTIAL CONSTRUCTION MARKET IN JAPAN

2.1 A SUMMARY OF HOUSING STARTS IN JAPAN

The single greatest end use for imported wood in Japan is housing construction. The Forestry Agency (2001) in Japan estimates that 62% of all lumber used in Japan went into building construction, with another 16% being used in civil engineering applications (e.g., concrete forms) in 1999. Japan's residential housing market has consistently been one of the largest and most dynamic in the world. From 1987-1997, Japan's housing starts were approximately equal to those in the United States, even though Japan has less than half the population and only 3.9% of the land area of the US. However, in response to the ongoing economic recession, annual housing starts in Japan have declined to approximately 1.05 million in 2002.

In 2001, housing starts in the US and Japan totaled 1.60 million and 1.17 million units respectively (Figure 2.1). Housing starts in the US and Japan have tended to follow world economic trends while exhibiting differences based on domestic trends as well. The economies of both countries grew rapidly in the early 1970s, as indicated by the high level of housing starts, until 1973 when the OPEC oil crisis slowed the economies and contributed to a decline in the number of new housing starts. Both countries also experienced housing slumps in the early 1980s and early 1990s in response to the second oil crisis and the Persian Gulf War, respectively (Figure 2.1).

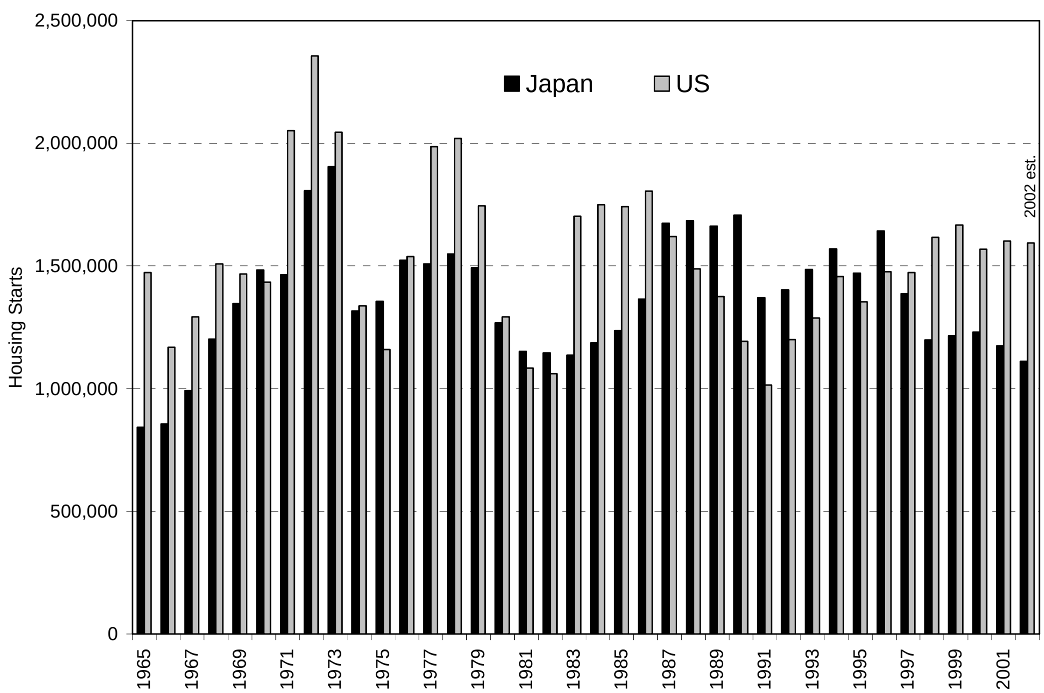

Figure 2.1. Comparison of Japanese and US housing starts, 1965-2002 (estimated).

In Japan, the number of housing starts built was very high during the late 1980s (the so-called Bubble-Economy) and in 1996. 1996 was the first time since the bubble economy that housing starts increased at double-digit rates over the previous year. The high number of housing starts in 1996 has been largely attributed to rebuilding after the 1995 Great Hanshin Earthquake in Kobe and an increase in the national consumption tax. The Kobe earthquake damaged approximately 147,600 houses (Japan Lumber Reports 1995) and displaced over 400,000 households (Pacific Rim Wood Market Report 1996). There were many new housing starts in 1996 also because homeowners rushed to purchase houses before the Ministry of Finance increased the national consumption tax from 3% to 5% on April 1, 1997. Since the increased consumption tax applied to housing construction, consumers wanted to avoid paying hundreds of thousands of yen in extra taxes.

Since 1997, Japan's continuing economic difficulties have had a devastating impact on the country's housing industry. Thousands of contractors have gone out of business and the number of new housing starts has declined from 1.66 million units in 1996 to just 1.17 million units in 2001. Not surprisingly, the decline in the number of housing starts has adversely effected US wood product exports to Japan. Exports of primary wood products declined 56% and secondary wood products declined 44.7% from 1996 to 2000 (USITC 2002). The impact of the weak Japanese economy and the decline in the number of housing starts has been compounded by the surprising strength of the yen and the relative weakness of the Canadian dollar and the Euro. The strong US dollar, compared to the weak Canadian dollar and Euro, has reduced the competitiveness of US wood products in Japan. European exports of softwood lumber to Japan have increased dramatically, largely at the expense of US and Canadian hemlock exports. From 1989-2000, the US share of Japan's softwood lumber market declined from 48.3% to 5.6% while the European market share increased from 0% to 25.1%.

2.1.1 Residential Construction Methods

Wood has always been an important part of the Japanese culture, and trees were thought to be the places where the native gods first descended to earth. As a result, wood has traditionally had strong religious meaning and most temples and shrines are built using wood. The Japanese people are deeply drawn to the aesthetic beauty, strength, and aroma of wood, and Japanese consumers place a high value on using wood in their homes. A survey conducted by the Japanese Prime Minister’s Office showed that, if given a choice, nearly 80% of Japanese homeowners would prefer to live in a wood house (Coaldrake 1990).

Three main types of wooden housing are built in Japan: traditional Japanese post-and-beam houses, 2x4 houses (both Japanese-style and North American-style), and prefabricated houses. Residential construction was traditionally dominated by wooden post and beam housing well into the mid-1970s, accounting for almost two-thirds of all residential housing starts in 1976 (Figure 2.2). However, continued growth in multi-family housing and non-wood prefabricated housing has contributed to the declining share of wooden housing. The period 1975-1988 saw a dramatic decline in the share of traditional wooden houses, dropping from 66.9% in 1975 to a historic low of just 41.4% in 1988. In the subsequent period from 1988-2001 the share of traditional wooden housing starts stabilized and even increased slightly to 45.1% in 2001 (GHLC 2001). In contrast, 2x4 housing starts have continued to increase their market share to almost 15% of wooden housing starts and 6.6% of total housing starts by 2001 (Figure 2.3). The success of the North American 2x4 construction technology in Japan has been largely due to the decline in the number of post and beam homes being built rather than any significant increase in 2x4 construction. Finally, wooden prefabricated housing starts have declined by about 50% since 1987, representing just 5.4% of total wooden housing starts in 2001.

Traditionally, most Japanese houses were typically replaced every 20-25 years, and most new homes were built on sites where the previous home has been demolished. Given the poor quality of most of the older post-war housing, it was generally considered more cost-effective and efficient to demolish older homes rather than repair or remodel them (Eastin 1994). An analysis of the Japanese housing stock suggests that there is still a significant number of houses that will need to be replaced over the next ten to twenty years, Figure 2.4. The number of houses built prior to 1980 totals approximately 18 million single-family residences. This assessment of the housing stock suggests that almost 900,000 single family residences will need to be built annually to replace existing houses. This built-in demand should continue to support annual housing starts in the 750,000-800,000 range over the next twenty years.

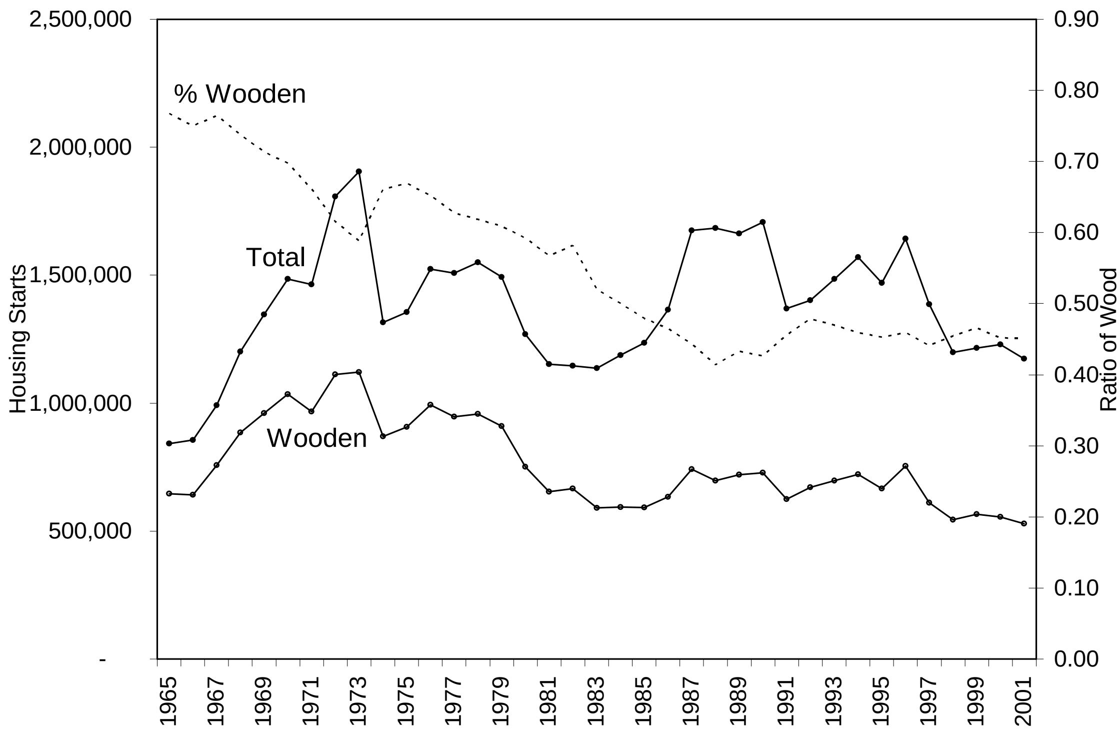

Figure 2.2. Wooden housing starts as a percentage of total housing starts, 1965-2001.

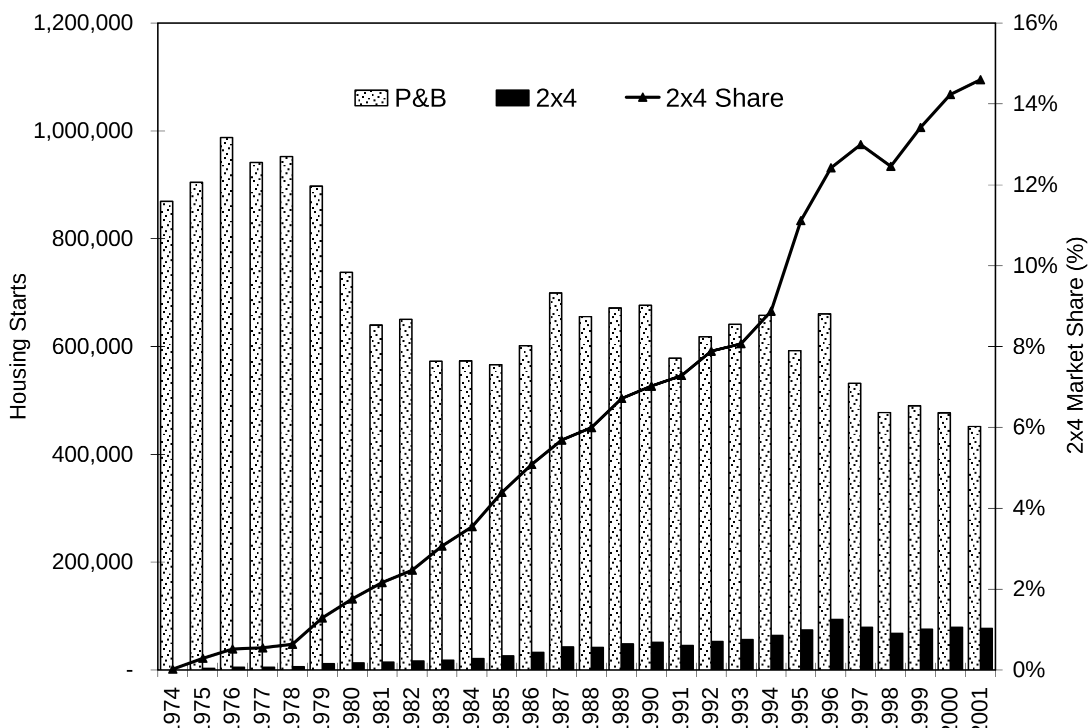

Figure 2.3. Comparison of post and beam housing starts relative to 2x4, 1974-2001.

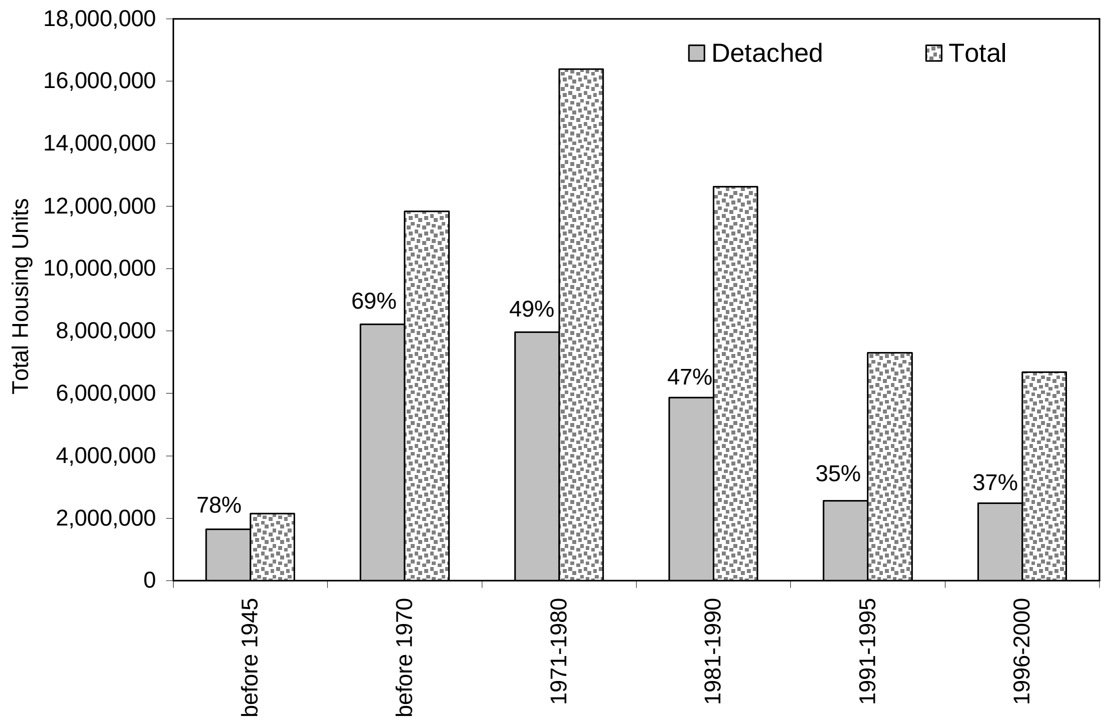

Figure 2.4. Inventory of residential housing stock by period of construction.

2.2 RECENT REGULATORY CHANGES IN THE RESIDENTIAL CONSTRUCTION INDUSTRY

2.2.1 Housing Quality Assurance Act

The Housing Quality Assurance Act (HQAA) was promulgated to provide homebuyers with specific safeguards and rights related to their purchase of a new home. The four objectives of the HQAA are to: (1) improve the quality, durability, and performance of residential homes, (2) provide homebuyers with a mechanism for resolving disputes with building contractors, (3) establish a housing completion guarantee system, and (4) establish a system of "Housing Performance Indication Standards" against which individual houses can be compared. The HQAA, which went into effect in April 2000, will significantly change the nature and structure of the residential construction industry in Japan, including the specification and use of domestic and imported wooden building materials. A more detailed assessment of the individual components of the HQAA is presented below.

The first objective of the HQAA is aimed at improving the quality, durability, and performance of new homes by requiring homebuilders to provide homebuyers with a ten-year warranty against structural defects and low durability (e.g., water infiltration into the structure). Under the guidelines of the HQAA, homebuyers may make claims against homebuilders if the structural performance or durability of a home is judged to be sub-standard relative to a specific set of judgement criteria. These judgement criteria, which have been published as a set of "Judgement Standards for Defects," are prescriptive in nature and very detailed.

The second objective of the HQAA is to establish a mechanism for resolving disputes between homebuyers and builders. To accomplish this objective, the HQAA mandates the establishment of Alternative Dispute Resolution (ADR) bodies in each prefecture in Japan. Each ADR will employ a lawyer to reconcile disagreements between builders and their customers during the ten-year warranty period. Using the "Judgement Standards for Defects" as a guide, the lawyer will judge the severity of the defect against the standard to determine if a defect exceeds the allowable guidelines. If a defect is judged to be in excess of the allowable standard, the builder will be required to correct the defect or compensate the homeowner.

The third objective of the HQAA includes a provision for a Completion Guarantee System to protect homebuyers against default by, or the bankruptcy of, their contractor before the home is completed. Framers of the HQAA included this provision for two reasons. It is typical in Japan for the homebuyer to provide financing to the contractor up front. For example, it is not unusual for the homebuyer to pay the contractor one-third of the price of the home before construction begins, with an additional third due after the house has been framed in, and the remaining funds due upon completion of the house. This system may have worked well in the past but, given the current economic recession in Japan, a number of contractors have recently gone bankrupt, leaving homebuyers with partially completed homes and outstanding payments due on building materials. The aim of the Completion Guarantee System is to provide homebuyers with a form of insurance so that, in the event their builder goes bankrupt, funds will be available to complete the construction of their house.

The fourth objective of the HQAA is to establish a voluntary system of "Housing Performance Indication Standards" against which the performance of individual houses can be compared. The specific types of performance characteristics contained in this provision of the HQAA include structural performance, fire safety, durability, ease of maintenance and management, energy efficiency, air quality, ratio of exterior openings to total wall area, noise transmission, and barrier free design. The performance of individual houses is judged by a "Designated Evaluation Body" using the criteria established in the "Japanese Housing Performance Indication Standards". These evaluation bodies are responsible for approving the architectural design of the house; they also perform inspections of the home during the construction process. Houses that meet or exceed the performance indication standards will receive certification as a "Performance Recognized House". This certification will provide the builder with a way to differentiate their homes from those of their competitors.

2.2.2 Implications of Regulatory Reform on Material Specification in Residential Construction

The reduced demand for North American softwood lumber can be partly attributed to the economic recession in Japan, yet it is not the only or even the most important factor. Perhaps a more significant factor has been a structural change within the residential construction industry where builders and pre-cut housing manufacturers prefer kiln-dried softwood lumber. While the Canadian and US softwood lumber industries were slow to recognize this shift in market preference, softwood lumber manufacturers in Europe (particularly Finland, Sweden, and Austria) were well positioned to capitalize on the changing market preference. European exports of kiln-dried lumber increased from less than 5,000 cubic meters in 1993 to over 2.3 million cubic meters in 2001. In reviewing the trade data, it is apparent that the success of European softwood lumber came largely at the expense of US, and to some extent Canadian, unseasoned hemlock lumber. Since 1989, the US share of the Japanese softwood lumber market has declined from 43% to 5.2% while the European market share has increased from 0% to 32.5% and the Canadian market share has decreased from 48.8% to 45%.

The factors that have caused this strategic change in the residential construction industry are the aging and declining number of carpenters in Japan and an effort to increase the quality of the new homes being built. In response to the decline in the number of carpenters in Japan, residential contractors have substantially increased their use of pre-cut post and beam housing kits. In the past, skilled carpenters cut all the joints and notches for the traditional post and beam house on the job site. While they frequently used green lumber to build the house, this was not too much of a problem because the components were fit together as soon as the joints were cut and the lengthy construction period required to build this type of house provided an adequate period for the green lumber to air dry with minimal drying defects. However, as the number of skilled carpenters continued to decline, many builders began to opt for pre-cut house packages where the notches and joints of the structural components are pre-cut to very exacting tolerances in a factory. Because of the high tolerances required for the joints to fit tightly together when the house is built, virtually all pre-cut manufacturers utilize kiln-dried lumber to manufacture their components. In fact, a great majority of them use kiln-dried glue-laminated lumber in place of solid sawn lumber in their manufacturing processes. In 2001, the number of pre-cut wood frame houses built in Japan exceeded 300,000.

As the demand for kiln-dried glue-laminated lumber by pre-cut housing manufacturers increased, the Japanese glue-laminated lumber industry struggled to increase their production capacity. Recognizing an opportunity to penetrate the Japanese market, European softwood lumber exporters were quick to supply kiln-dried lamstock to Japanese glue-laminated lumber manufacturers. By providing a high quality, competitively priced product, the Europeans have rapidly increased their share of the Japanese softwood lumber market. In fact, as the increasing production capacity of the glue-laminated lumber industry began to exceed the demand for glue-laminated lumber from the pre-cut housing industry, glue-laminated lumber producers began to promote their products to traditional post and beam builders as a dimensionally stable substitute for green lumber.

Not only have the Europeans been willing to provide the Japanese with kiln-dried lumber, but there is a widespread perception in Japan that the quality of European whitewood lamstock is superior to North American hemlock and SPF lumber (a mix of spruce, pine, and fir lumber). Furthermore, Europeans suppliers have been much more willing to meet the specific needs of their Japanese customers than the Americans or even the Canadians. For example, a number of Japanese lumber importers have said that their European suppliers are willing to provide full shipments of specific length lumber while their Canadian suppliers often require them to purchase a mix of lengths rather than the specific length they are looking for. Perhaps this difference between the Europeans and Canadians can be attributed to the fact that European lumber manufacturers export to a broad range of markets, all of which have different product specifications. Thus they have learned to be responsive to each customers' product requirements and they have learned how to incorporate a broad mix of products into their manufacturing process. This is a practice that North American lumber exporters are going to have to adopt if they expect to remain competitive in the Japanese market.

3.0 A DESCRIPTION OF THE STRUCTURAL FRAMEWORK OF POST AND BEAM HOMES

The following section provides a detailed description of post and beam construction technology in order to ensure a better understanding of the major structural end-use applications and the technical specifications for structural lumber used in each end-use application. This information should be useful in helping North American lumber manufacturers better understand how their lumber products are used in post and beam construction. It should also provide them with insights into what the technical specifications are for structural lumber used in each end-use application.

3.1 CONSTRUCTION DETAILS OF POST AND BEAM HOUSES

In contrast to the North American 2x4 construction system, the Japanese post and beam system has a larger number of structural components and component sizes. The major structural components of the post and beam system, including cross-sectional sizes and lengths, are summarized in Table 3.1. In addition, the approximate volume of lumber used in each end-use application is provided in the table. Note that the lumber volume estimates are for a typical 30 *tsubo* post and beam house (which translates into 1,066 square feet). The construction details for a typical Japanese post and beam house are presented in Figure 3.1. This section will briefly describe the construction details of a Japanese post and beam house.

The typical Japanese post and beam house is built on short concrete foundation walls over a concrete slab. The ground sills (*dodai*) are laid on the top of the foundation walls. Girders (*obiki*), which are placed on top of floor posts (*tsuka*), run the length of the house and provide support for the floor joists (*neda*). The *neda* are placed atop and perpendicular to the girders. This structure forms the platform for the first floor of a post and beam house. It should be noted that these structural components are all exposed to insect attack from beneath the house in the crawl space.

The main vertical structural posts of the house (often referred to as *hashira*) are comprised of balloon posts (*toshibashira*) and posts (*kudabashira*). *Toshibashira* extend up for two floors and are usually located at the corners of the house and in the mid-span along the length of the house. The *kudabashira* are located between the *toshibashira* and are used to frame in a single floor of the house. Non-structural studs (*mabashira*) are placed between the structural posts and are used primarily for attaching sheetrock onto the walls. Finally, diagonal braces (*sujikai*) are inset into the posts (*hashira*) to provide lateral support for the wall system. Since exterior wall sheathing is generally not used in post and beam houses, shear strength for the wall system is derived from both the diagonal bracing members and a system of metal corner connections. Beams (*hirakaku*) are placed atop the walls and across the width of the house. These beams provide the support for the upper floors of the house and tie the exterior walls of the house together. The same structural lumber members are used to frame in the second floor of a post and beam house, although the height of the walls is generally shorter than on the first floor.

The roof system for most post and beams houses is a rafter system, with truss systems still being relatively rare in Japan. The top floor of the house is generally tied together with a combination of beams (*hirakaku*) and tie beams (*hari*) that are placed across the width of the house. A top plate (*keta*) is laid along the top of second floor exterior walls, and is used as a point of attachment for the rafters (*taruki*). Roof posts (*koyazuka*) are placed atop the beams and tie beams to provide vertical support for the roof components. Purlins (*moya*) are placed atop the roof posts and run the length of the house. The central purlin forms the ridge of the roof system is called the ridge beam (*munagi*). After the purlins have been set in place, the rafters are laid across the roof from the central ridge beam down to the top plate. The rafters are nailed to the ridge beam, each of the purlins, and to the top plate.

Table 3.1. Approximate volume and specifications for structural lumber used in ground contact applications for a typical 30 *tsubo* (1,066 square feet) Japanese post and beam house.

Structural Member	English Translation	Cross-section size (millimeters)	Length (meters)	Lumber Volume
Dodai	Ground sill	105x105 (80-90%) 120x120 (10-20%)	4.0* 3.65, 3.0	0.8 m^3
Tsuka	Floor post	90x90	Short lengths	0.2 m^3
Obiki	Girder	105x105 (80-90%) 90x90 (10-20%)	4.0* 3.65, 3.0	0.2 m^3
Neda	Joist	45x45, 45x60, 60x60, 45x105	4.0* 3.65, 3.0	0.7 m^3
Toshibashira	Balloon Post	120x120 105x105	6.0	0.7 m^3
Kudabashira	Post	105x105 (75%) 120x120 (25%)	3.0* 2.8 (2nd floor)	1.7 m^3
Mabashira	Non-structural stud	27x105 (70%) 30x105 (25%) 45x105 (5%) new size	3.0* 2.8 (2nd floor)	1.7m^3
Sujikai	Diagonal wall brace	45x90	3.0	0.5 m^3
Hirakaku	Structural beam	120x240, 105x210 105x180	4.0* (70-80%) 3.0 (20-30%)	5.0 m^3
Keta	Top Plate	105x105	4.0	0.4 m^3
Koyazuka	Roof support post	105x105, 90x90	Various short lengths	0.4 m^3
Moya	Purlin	90x90	4.0	0.7 m^3
Taruki	Rafter	45x45, 30x40	4.0, 3.8 3.65, 3.0	0.5 m^3
Munagi	Ridge beam	105x105 90x90	4.0	0.1 m^3

Notes: 1 *tsubo* equals 3.3 square meters or 35.5 square feet; * indicates primary lumber length used.

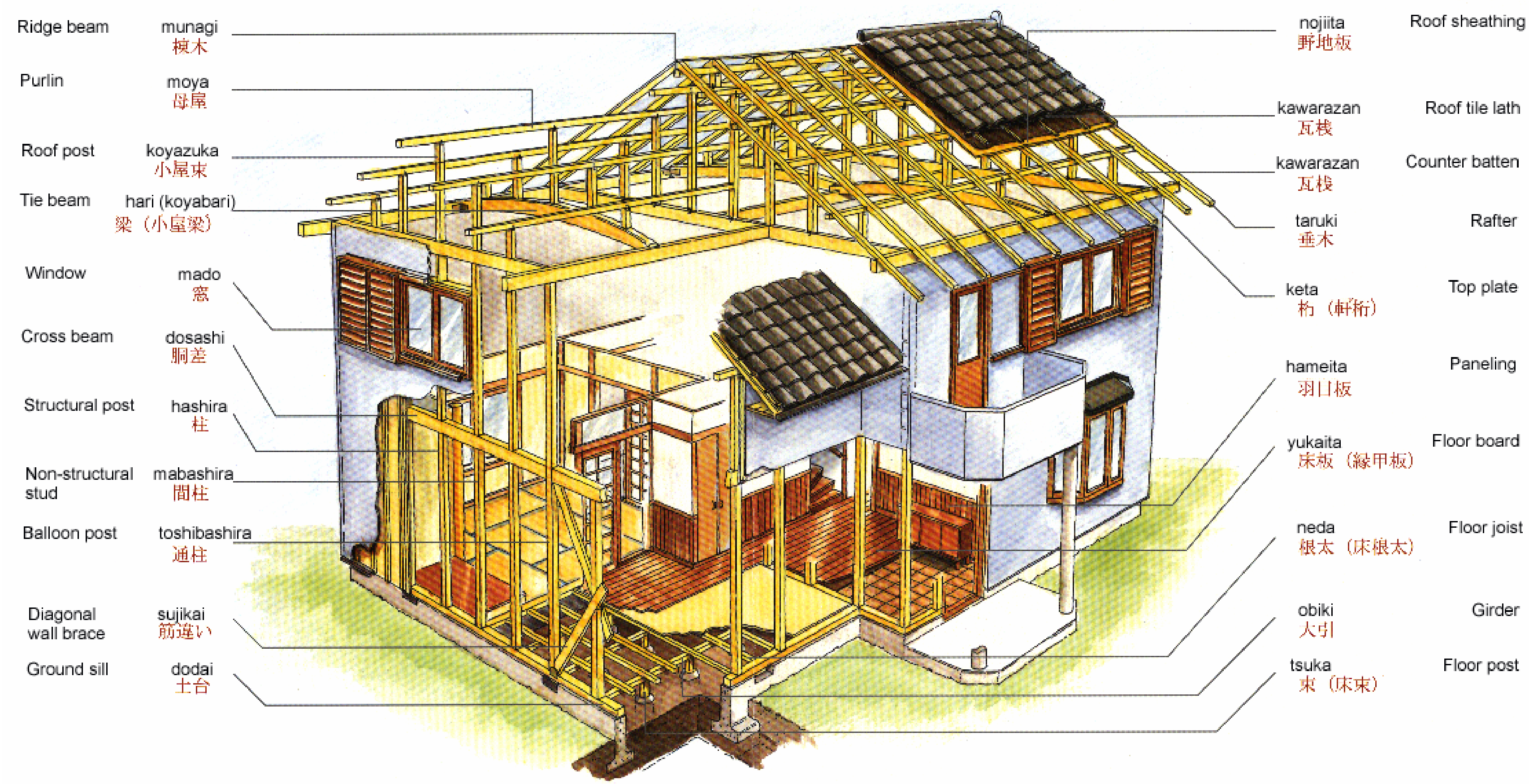

Figure 3.1. Illustration of structural components in a typical Japanese post and beam house.

Source: Nordic Timber Council

3.2 ESTIMATING WOOD USE IN SPECIFIC END-USE APPLICATIONS IN POST AND BEAM HOMES

The volume of wood used in the structural framework of a post and beam house ranges from 13-15 cubic meters for the typical 30 *tsubo* house. The volume estimates for the various structural components were derived from several sources, including the material specification list of a post and beam home builder and volume estimates of professional builders and industry experts. These volumetric estimates are presented in Table 3.1 along with the technical specifications of the various structural components.

By far, the largest volume of wood is used for the structural beams (*hirakaku*). This single end-use requires about 5 cubic meters of lumber and accounts for 38% of the softwood lumber used to frame a post and beam house. The second largest end-uses of wood are the posts (*kudabashira or hashira*) and the diagonal cross braces (*sujikai*) which each use about 1.7 cubic meters of wood and together account for an additional 25.6% of the structural lumber used to frame the house.

By end-use application, the foundation system (*dodai*, *tsuka, obiki, and neda*) requires 1.9 cubic meters of lumber and accounts for 14.3% of the structural lumber use. The wall system (comprised of the *toshibashira, kudabashira, mabashira, and sujikai*) requires 4.6 cubic meters of lumber and accounts for 34.6% of the structural lumber use. The structural beams (*hirakaku*) require 5 cubic meters and account for 38% of the structural lumber use. Finally, the roof system (comprised of the *keta*, *koyazuka*, *moya*, *munagi*, *and taruki*) requires 1.8 cubic meters of lumber and accounts for 13.5% of the structural lumber use.

4.0 A SURVEY OF THE POST AND BEAM INDUSTRY IN JAPAN

The recent regulatory changes in the Japanese residential construction industry imply that builders are beginning to change the types of wood products that they use to build homes. To obtain demographic information and to better understand post and beam builder's changing use of softwood lumber, a survey was administered to Japanese residential construction builders between August and December 2001. Cluster sampling was used to divide Japan into four geographic regions (Kanto, Kansai, Kyushu, Tohoku) and a random sample was taken from each cluster. A total of 2,515 surveys were sent out in two separate mailings. A total of 460 usable surveys were returned, representing a response rate of 19%.

The respondents were divided into small builders (under ¥10 billion in annual sales), medium builders (between ¥10 and ¥20 billion in annual sales) and large builders (over ¥20 billion in annual sales), Table 4.1. Over 70% of the survey respondents were small builders while 17% were medium sized builders and just over 10% were large builders. Survey respondents were fairly evenly distributed between the four geographic regions identified for the survey, Table 4.2.

Table 4.1. Summary of survey respondents, by firm size.

Firm Revenue	Number of Respondents	Percentage of Respondents
Small (Below ¥10 billion) (Below US$83 million)	328	71%
Medium (¥10-20 billion) (US$83-167 million)	77	17%
Large (Over ¥20 billion) (Over US$167 million)	52	11%

Note: Currency conversions were based on ¥120 per US dollar.

Table 4.2. Summary of survey respondents, by region.

Region	Number of Respondents	Percentage of Respondents
Kanto	119	26%
Kansai	90	20%
Kyushu	107	23%
Tohoku	99	22%
Other	45	9%

One of the more important results of the survey was the predicted increase in the New post and beam Building Method (often referred to as the "Rationalized post and beam System"), where structural panels and metal connectors are used, Table 4.3. Companies were asked to identify the different types of construction technology that they used in 2000 and to predict the types of building technologies that they would be using in 2005. The biggest increase was observed in the predicted use of the New post and beam Method, which increased from 22% in 2000 to 39% in 2005. The expected increase in the use of the Rationalized System was observed across all of the geographic regions, Table 4.4.

Table 4.3. Respondents' current use of construction technology and predicted use in 2005.

Building Method	2000	2005 (Predicted)
New Post and Beam (Using Panels, Metal Connectors, etc)	22.0%	39.0%
Traditional Post and Beam	64.0%	44.0%
North American Style 2x4 (220 x 2440 mm Module)	1.6%	2.4%
Japan Style 2x4 (910 x 1820 mm Module)	7.0%	7.6%
Wooden Prefab	0.8%	1.6%
Steel Prefab	1.2%	1.7%
Concrete Prefab	0.33%	0.57%
Other	2.8%	2.8%

Table 4.4. Builders' current and predicted use of the Rationalized Building Method, by region.

Region	2000	2005 (Predicted)
Kanto	24.0%	41.4%
Kansai	22.6%	37.4%
Kyushu	13.3%	32.0%
Tohoku	25.0%	42.6%
Other	26.2%	42.5%

Survey respondents indicated that their use of structural products has changed significantly over the past two years, Table 4.5. For example, survey respondents indicated that their use of structural glu-lam beams and kiln-dried lumber had increased by 50.9% and 59.2%, respectively. In contrast, 61.9% of the survey respondents reported that their use of green lumber had decreased over the past two years. These results clearly show the trend away from green lumber toward kiln dry and laminated products.

Table 4.5. Trends of Product Use Over Past 2 Years

	Increased	No Change	Decreased	Not Used
Decorative Overlay Laminated Post	28.0%	21.8%	8.4%	41.8%
Glu-Lam Beam	50.9%	20.4%	5.0%	23.7%
LVL	20.4%	15.8%	9%	54.8%
Kiln Dry Lumber	59.2%	25.5%	8%	7.3%
Green Lumber	.9%	16.5%	61.9%	20.7%

The use of different structural materials for specific structural end-use applications is summarized in Table 4.6. These survey results show several interesting things. First, the use of kiln-dried lumber is strong across all six end-use applications. A large portion of the demand for kiln-dried lumber is derived from the manufacturers of pre-cut post and beam houses. The survey results indicated that 63% of the homes built by small builders were pre-cut homes, while 81% of the homes built by medium-sized builders and 89% of the homes built by large builders were pre-cut. The use of glu-lam beams for posts and beams was 32.4% and 21.3%, respectively, suggesting that these market segments are far from their saturation point and there is ample room for growth. Builders' use of green lumber, while declining substantially over the past two years, is still surprisingly strong despite the new 10 year housing warranty. Finally, builders' use of more innovative products (at least within the Japanese market) such as LVL, wooden I-joists, finger-jointed lumber, and veneer wrapped lumber, is still very small (Tables 4.6, 4.7 and 4.8). This last trend suggests that Japanese builders are much more conservative in their adoption and use of new wood products than are builders in North America.

Table 4.6. Respondents' use of softwood lumber in specific end-use applications.

Building Application	Wood I-Joist	Finger Jointed Lumber	Decorative Overlay Lumber	Glu-Lam Beams	LVL	Kiln Dry Lumber	Green Lumber	Other
Floor Joist (*neda*)	1.1%	0.5%	0.3%	2.5%	0.9%	51.5%	21.3%	2.4%
Sill Plate (*dodai*)	0.3%	0.3%	0.0%	7.1%	0.5%	54.0%	29.4%	5.9%
Beam (*hari*)	0.4%	0.9%	2.5%	21.3%	1.5%	47.6%	23.4%	1.4%
Post (*hashira*)	0.3%	0.9%	3.8%	32.4%	2.7%	44.8%	12.9%	1.7%
Mid-Post (*mabashira*)	0.2%	4.7%	0.4%	9.3%	4.8%	55.2%	23.8%	1.4%
Rafters (*taruki*)	0.0%	0.1%	0.0%	1.0%	0.4%	51.6%	43.5%	2.5%

Table 4.7. Small builders use of different lumber products.

	Beam	Post	Mid-Post
Decorative Overlay Laminated Post	2.7%	3.9%	0.6%
Glu-Lam Beam	19.3%	27.1%	8.8%
LVL	1.1%	2.6%	3.3%
Kiln Dry Lumber	48.1%	48.6%	55.5%
Green Lumber	25.2%	14.5%	26.6%

Table 4.8. Large builders use of different lumber products.

	Beam	Post	Mid-Post
Decorative Overlay Laminated Post	1.2%	5.3%	0.0%
Glu-Lam Beam	37.2%	55.8%	11.4%
LVL	3.1%	1.7%	11.6%
Kiln Dry Lumber	39.9%	29.1%	58.0%
Green Lumber	15.8%	7.5%	10.4%

The survey data was also analyzed to evaluate regional differences in materials use, Tables 4.9-4.12. Perhaps the biggest regional difference observed was in Kyushu where the use of green lumber was substantially higher than in the other regions. In contrast, the diffusion of engineered wood products into Kyushu was relatively low. For example, builders in Kyushu reported using glu-lam lumber in just 9% of their beam applications whereas builders in the other three regions used glu-lam lumber in over 30% of their beam applications.

Table 4.9. Use of Various Materials: Kanto Region

	Beam	Post	Mid-Post
Decorative Overlay Laminated Post	4.1%	4.3%	0.0%
Glu-Lam Beam	25.9%	39.9%	12.5%
LVL	2.6%	3.3%	6.0%
Kiln Dry Lumber	43.6%	36.2%	52.9%
Green Lumber	20.3%	12.4%	19.4%

Table 4.10. Use of Various Materials: Kansai Region

	Beam	Post	Mid-Post
Decorative Overlay Laminated Post	4.2%	5.8%	1.4%
Glu-Lam Beam	24.3%	33.2%	11.0%
LVL	1.3%	3.4%	7.3%
Kiln Dry Lumber	42.8%	41.0%	50.9%
Green Lumber	24.2%	9.1%	23.8%

Table 4.11. Use of Various Materials: Tohoku Region

	Beam	Post	Mid-Post
Decorative Overlay Laminated Post	1.8%	3.9%	0.3%
Glu-Lam Beam	22.8%	38.1%	7.2%
LVL	1.0%	2.5%	3.4%
Kiln Dry Lumber	55.3%	45.5%	65.0%
Green Lumber	14.5%	6.2%	16.9%

Table 4.12. Use of Various Materials: Kyushu Region

	Beam	Post	Mid-Post
Decorative Overlay Laminated Post	0.7%	2.6%	0.3%
Glu-Lam Beam	9.2%	9.1%	4.8%
LVL	0.2%	0.7%	0.4%
Kiln Dry Lumber	49.8%	61.8%	53.0%
Green Lumber	37.4%	23.0%	37.9%

The survey also examined the attitudes of Japanese builders towards four different factors, including their preference for domestic lumber products, their price sensitivity, their attitude towards risk, and the importance the builder places on customer service, Tables 4.13 and 4.14. The attitudes were measured on a Likert-like scale of 1 to 7, where a score of 1 represented the lowest level, a score of 4 represented the mid-point and a score of 7 represented the highest level. The overall survey results showed that the levels of preference for domestic lumber (4.6), price sensitivity (4.3), and customer service (5.2) were all above the mid-point value of 4. In contrast, the level of willingness to pursue risk (3.1) was well below the mid-point.

Table 4.13. Attitudes by Company Size.

	Small	Medium	Large
Preference for Domestic Lumber	4.7	4.4	4.3
Price Sensitivity	4.3	4.4	4.5
Willingness to Pursue Risk	3.0	3.1	3.2
Customer Service	5.1	5.3	5.7

Table 4.14. Attitudes by Region

	Kanto	Kansai	Tohoku	Kyushu
Preference for Domestic Lumber	4.6	4.6	4.5	4.9
Price Sensitivity	4.3	4.3	4.5	4.0
Willingness to Pursue Risk	3.0	3.0	3.2	2.9
Customer Service	5.2	5.3	5.3	5.0

In examining the differences in responses based on company size, the results suggest that the large builders are slightly more price sensitive and substantially more customer service oriented than are the small builders, Table 4.13. On the other hand, the large builders demonstrated a relatively lower preference for domestic lumber than did the small builders. An analysis of the survey data based on geographic regions found that the responses of the survey respondents were fairly similar, with the exception of builders in Kyushu, Table 4.13. In Kyushu, the average scores relating to their preference for domestic lumber products and their price sensitivity were 4.9 and 4.0, respectively. In contrast, the average scores for builders located in the other regions were 4.6 and 4.4, suggesting that builders in Kyushu are less price sensitive and have a higher preference for domestic lumber products than builders in the other regions.

4.1 SUMMARY CONCLUSIONS FROM THE SURVEY

One of the most important findings of this survey is the projected growth of the rationalized post and beam market segment. The data show that the rationalized (or new) post and beam construction method will grow 77% over the next 5 years. Overall kiln-dried and engineered wood products showed substantial increases in Japan over the past 2 years. However, the highest rates of adoption were seen by large builders and builders in the three regions excluding Kyushu. The survey also showed that while the use of green lumber is declining, it is still widely used. The results of the attitude survey suggest that builders have become very price sensitive and are more open to using imported building materials.

5.0 MATERIAL USE BY POST AND BEAM PRE-CUT MILLS IN JAPAN

5.1 AN INDUSTRY OVERVIEW

As mentioned previously, homebuyer concerns about housing quality, combined with the introduction of the mandatory 10 Year Housing Warranty, have contributed to a basic restructuring of the residential construction industry in Japan. While the vast majority of residential houses built in Japan still utilize the post and beam construction technology, this technology has changed substantially over the past six years. Whereas most post and beam houses were carefully hand crafted on the construction site with skilled carpenters making complicated joints using hand tools, today the majority of post and beam homes are pre-cut in a manufacturing facility with computer assisted machine centers making the complicated joints to highly precise specifications and tolerances. In addition, most pre-cut manufacturers incorporate metal connectors into their house designs to improve the strength and earthquake resistance of the homes.

In 2001, the number of wooden post and beam housing starts in Japan totaled 451,815. Of this total, 77.8% (or 351,512 houses) were produced by the pre-cut manufacturing industry. Recently, a survey of the pre-cut post and beam manufacturing industry was conducted regarding their material use in four specific end-use applications: balloon posts (*toshibashira*), posts (*kudabashira*), structural beams (*hirakaku*), and ground sills (*dodai*). The survey asked pre-cut manufacturers to identify the species and percent breakdown of the individual species of lumber used in each of the four end-use applications in 2000. The results of this survey are summarized in Tables 5.1-5.4. A total of 455 pre-cut manufacturers responded to the survey, representing 77.8% of the pre-cut homes produced in 2000. The results of the survey indicate that the average size of a pre-cut post and beam house is 35 *tsubo*, and that the industry employs almost 30,000 workers.

5.2 SPECIES USE IN SPECIFIC APPLICATIONS WITHIN THE PRE-CUT INDUSTRY

The volume breakdown of lumber use within the four primary structural end-use applications are summarized in Tables 5.1-5.4. The data has generally been broken down to include three product categories for each species. These three product categories are green lumber, glu-lam lumber (EW), and kiln-dried lumber (KD). For example, the first species category in Table 5.1 is sugi. The survey data indicates that pre-cut manufacturers used 62,512.6 cubic meters of green sugi lumber, 2,532.1 cubic meters of sugi glu-lam lumber and 30,514.1 cubic meters of kiln-dried sugi lumber for post applications in 2000. Total use of sugi lumber was 95,558.8 cubic meters, representing 26.6% of total lumber use for posts within the pre-cut industry.

The primary species used for posts (*kudabashira*) by Japanese pre-cutters are imported European whitewood (spruce) glu-lam lumber, solid sawn Japanese sugi lumber, and solid sawn Japanese hinoki lumber, Table 5.1. The total volume of lumber used for *kudabashira* by pre-cutters was 359,773 cubic meters. These three species represent almost 92% of the lumber used for posts within the pre-cut industry. Pre-cutters also used a small volume of Alaska yellow cedar (3,065 cubic meters) and Sitka spruce (1,059 cubic meters) for *kudabashira*. Virtually all of the European whitewood lumber being used by pre-cutters is kiln-dried and laminated. In contrast, approximately two-thirds of the sugi and hinoki lumber used by pre-cutters is green. It is interesting to note that pre-cutters use almost no glu-lam sugi or hinoki lumber. This reflects the fact that the glu-lam lumber industry is under developed in Japan and most glu-lam manufacturers rely on imported species for their raw material stock.

This data highlights the dramatic shift in material use that has occurred as a result of the Housing Quality Assurance Act. During the first half of the 1990s, there was virtually no European whitewood lumber being used in Japan and the primary products being used were solid sawn green hemlock posts. However, the shift towards pre-cutting houses in Japan, combined with concern about the dimensional stability of green hemlock posts and the reluctance of North American lumber manufacturers to kiln dry their hemlock posts, provided an opportunity for the European glu-lam industry.

Table 5.1. Species use by Japanese pre-cut manufacturers for posts (*kudabashira*).

Species	Volume	Volume	Share
Sugi	62,512.60	95,558.80	26.6%
Sugi(EW)	2,532.10		
Sugi(KD)	30,514.10		
Hinoki	36,008.90	61,336.40	17.0%
Hinoki(EW)	1,363.80		
Hinoki(KD)	23,963.70		
Hemlock	2,272.70	2,694.20	0.7%
Hemlock(EW)	123.40		
Hemlock(KD)	298.10		
EurWW	475.20	173,353.20	48.2%
EurWW(EW)	171,548.20		
EurWW(KD)	1,329.80		
EurRW	0.00	9,786.20	2.7%
EurRW(EW)	9,786.20		
EurRW(KD)	0.00		
SP	562.80	1,058.60	0.3%
SP(EW)	236.60		
SP(KD)	259.20		
DF	1,355.20	5,305.40	1.5%
DF(EW)	3,725.50		
DF(KD)	224.60		
AYC	809.70	3,061.60	0.9%
AYC(EW)	526.60		
AYC(KD)	1,725.20		
EW	1,256.90	1,256.90	0.3%
Matsu Com.	243.20	4,825.40	1.3%
Matsu Com.(EW)	3,088.40		
Matsu Com.(KD)	1,493.80		
RP	0.00	1,536.70	0.4%
RP(EW)	1,536.70		
RP(KD)	0.00		
Total	***359,773.4***		

Units: Volume = m^3

Table 5.2. Species use by Japanese pre-cut manufacturers for balloon posts (*toshibashira*).

Species	Volume	Volume	Share
Sugi	24,834.6	34,144.9	23.1%
Sugi(EW)	1,418.9		
Sugi(KD)	7,891.4		
Hinoki	28,245.5	45,535.6	30.7%
Hinoki(EW)	2,321.4		
Hinoki(KD)	14,968.7		
Hemlock	899.4	905.4	0.6%
Hemlock(EW)	0.0		
Hemlock(KD)	6.0		
EurWW	82.3	20,570.6	13.9%
EurWW(EW)	20,488.3		
EurWW(KD)	0.0		
EurRW	0.0	2,864.1	1.9%
EurRW(EW)	2,864.1		
EurRW(KD)	0.0		
SP	384.0	948.0	0.6%
SP(EW)	564.0		
SP(KD)	0.0		
DF	1,670.4	30,830.7	20.8%
DF(EW)	28,766.0		
DF(KD)	394.3		
AYC	188.6	1,374.5	0.9%
AYC(EW)	1,028.6		
AYC(KD)	157.4		
EW	5,012.0	5,012.0	3.4%
Matsu Com.	135.4	5,837.6	3.9%
Matsu Com.(EW)	5,702.1		
Matsu Com.(KD)	0.0		
RP	0.0	90.0	0.1%
RP(EW)	90.0		
RP(KD)	0.0		
Total	***148,113.4***		

Units: Volume = m^3

Table 5.3. Species use by Japanese pre-cut manufacturers for structural beams (*hirakaku*).

Species	Volume	Volume	Share
Sugi	37,771.8	42,109.5	2.5%
Sugi(EW)	2,811.4		
Sugi(KD)	1,526.4		
Hinoki	834.2	1,489.4	0.1%
Hinoki(EW)	175.2		
Hinoki(KD)	480.0		
Hemlock	6,092.2	6,092.2	0.4%
Hemlock(EW)	0.0		
Hemlock(KD)	0.0		
EurWW	8,142.7	202,935.2	12.1%
EurWW(EW)	190,324.6		
EurWW(KD)	4,467.8		
EurRW	883.2	94,796.5	5.7%
EurRW(EW)	93,913.3		
EurRW(KD)	0.0		
SP	4,600.3	8,257.9	0.5%
SP(EW)	1,872.0		
SP(KD)	1,785.6		
DF	649,427.9	1,278,023.9	76.3%
DF(EW)	132,437.6		
DF(KD)	496,158.4		
AYC	0.0	0.0	0.0%
AYC(EW)	0.0		
AYC(KD)	0.0		
EW	8,552.6	8,552.6	0.5%
Matsu Com.	10,900.8	29,684.3	1.8%
Matsu Com.(EW)	10,750.2		
Matsu Com.(KD)	8,033.3		
RP	2,304.0	2,304.0	0.1%
RP(EW)	0.0		
RP(KD)	0.0		
Total	***1,674,245.6***		

Units: Volume = m^3

Table 5.4. Species use by Japanese pre-cut manufacturers for ground sills (*dodai*).

Species	Volume	Volume	Share
Sugi	2,134.5	2,360.8	1.1%
Sugi(EW)	226.3		
Sugi(KD)	0.0		
Hinoki	53,186.4	53,186.4	23.7%
Hinoki(EW)	0.0		
Hinoki(KD)	0.0		
Hemlock	97,401.8	103,281.1	46.1%
Hemlock(EW)	4,719.1		
Hemlock(KD)	1,160.2		
EurWW	0.0	0.0	0.0%
EurWW(EW)	0.0		
EurWW(KD)	0.0		
EurRW	0.0	617.1	0.3%
EurRW(EW)	617.1		
EurRW(KD)	0.0		
SP	0.0	384.0	0.2%
SP(EW)	384.0		
SP(KD)	0.0		
DF	4,915.9	5,609.2	2.5%
DF(EW)	309.3		
DF(KD)	384.0		
AYC	27,309.8	45,691.5	20.4%
AYC(EW)	13,575.6		
AYC(KD)	4,806.2		
EW	510.2	510.2	0.2%
Matsu Com.	5,774.5	5,906.2	2.6%
Matsu Com.(EW)	131.7		
Matsu Com.(KD)	0.0		
RP	123.4	1,974.9	0.9%
RP(EW)	1,851.4		
RP(KD)	0.0		
Apitong	4,684.9	4,684.9	2.1%
Total	***224,206.2***		

Units: Volume = m^3

Lumber use for balloon posts (*toshibashira*) is summarized in Table 5.2. The total volume of lumber used for *toshibashira* by pre-cutters was 148,113 cubic meters. The survey data indicates that solid sawn Japanese hinoki is the primary species used, followed by solid sawn Japanese sugi, imported Douglas-fir glu-lam, and imported European whitewood glu-lam. A small volume of Alaska yellow cedar (1,375 cubic meters) and Sitka spruce (948 cubic meters) was also used. As was the case with *kudabashira*, the majority of the domestic lumber is used green while the majority of the imported lumber is kiln-dried.

Lumber use for structural beams (*hirakaku*) is summarized in Table 5.3. The total volume of lumber used by pre-cutters for *hirakaku* was 1,674,246 cubic meters. Over 75% of the lumber used for *hirakaku* was imported Douglas-fir, while an additional 12.1% was European whitewood. Pre-cutters also used a small volume of Sitka spruce (8,258 cubic meters) for structural beams. It is interesting to note that while Japanese pre-cutters favor Douglas-fir in *hirakaku* applications, they distinguish between two very different structural beam products. The first product type is relatively high quality, imported solid sawn Douglas-fir beams that are cut in North America from high quality logs. The second product type is lower quality, Douglas-fir beams that are sawn domestically from lower quality, imported Douglas-fir logs. The primary difference cited by pre-cutters between these two products is the fact that domestically produced beams have relatively wide growth rings whereas imported beams have much narrower growth rings and are therefore perceived to be more dimensionally stable and stronger than are the domestically produced beams.

Lumber use for ground sills (*dodai*) is summarized in Table 5.4. The total volume of lumber used by pre-cutters for *dodai* was 224,206 cubic meters. Almost half of the lumber used for *dodai* was imported hemlock. The other major species used for *dodai* were Japanese hinoki (23.7%) and Alaska yellow cedar (20.4%). Together these three species represented over 90% of the lumber used for *dodai* within the pre-cut industry.

Lumber use within the pre-cut industry can also be broken down by the type of lumber product used: green lumber, kiln-dried lumber, or glu-lam lumber, Table 5.5. The survey results show that almost half of the lumber used by Japanese pre-cutters is green, with another 25% being kiln-dried and the remaining 30% being glu-lam lumber. With respect to specific end-use applications, 71% of the lumber used for *kudabashira* is dried, 62% of the lumber used for *toshibashira* is dried, 57% of the lumber used for *hirakaku* is dried, and just 13% of the lumber used for *dodai* is dried.

Table 5.5. Use of different lumber products in the major structural end-use applications.

Lumber Type	*Kudabashira*	*Toshibashira*	*Hirakaku*	*Dodai*	*Total*
Green	104,240 (29%)	56,442 (38%)	720,957 (43%)	195,495 (87%)	1,077,134 (45%)
Kiln-dried	59,808 (17%)	23,418 (16%)	512,452 (31%)	6,350 (3%)	602,028 (25%)
Glu-lam	195,724 (54%)	68,253 (46%)	440,837 (26%)	22,325 (10%)	727,139 (30%)

Units: Volume = m^3 and percentages.

6.0 ESTIMATING POTENTIAL DEMAND FOR STRUCTURAL LUMBER IN THE POST AND BEAM INDUSTRY

Using the information derived from the survey of the Japanese pre-cut industry, residential construction statistics, and interviews with housing industry experts and Japanese home builders provides the basis for estimating the volume of structural lumber used in the Japanese post and beam industry annually, Table 6.1. The volume estimates presented in Table 6.1 are based on the 450,000 post and beam housing starts recorded in 2001.

The total volume of structural lumber used in post and beam houses in 2001 was approximately 7.1 million cubic meters. The end-use application that consumed the greatest volume of structural lumber was structural beams (*hirakaku*), representing 32% of structural lumber usage. Other important end-uses included posts (*kudabashira*: 11%), non-structural studs (*mabashira*: 11%), floor joists (*neda*: 9%), balloon posts (*toshibashira*: 9%), and purlins (*moya*: 9%).

Material use was also evaluated based on the four major structural end-use applications, Table 6.1. Based on this analysis, the wall system consumed the largest volume of structural lumber (34%), followed by structural beams (32%), the roof system (18%), and the floor system (17%).

Table 6.1. Estimates of total structural lumber use in post and beam construction, 2001.

Structural Member	English Translation	Lumber Volume per house	Total Lumber Volume
Dodai	Ground sill	0.8 m^3	360,000 m^3
Tsuka	Floor post	0.2 m^3	90,000 m^3
Obiki	Girder	0.2 m^3	90,000 m^3
Neda	Joist	0.7 m^3	643,000 m^3
Sub-Total	**Floor System**		**1,183,000 m^3**
Toshibashira	Balloon Post	0.7 m^3	643,000 m^3
Kudabashira	Post	1.7 m^3	765,000 m^3
Mabashira	Non-structural stud	1.7 m^3	765,000 m^3
Sujikai	Diagonal wall brace	0.5 m^3	225,000 m^3
Sub-Total	**Wall System**		**2,398,000 m^3**
Hirakaku	Structural beam	5.0 m^3	2,250,000 m^3
Sub-Total	**Structural Beams**		**2,250,000 m^3**
Keta	Top plate	0.4 m^3	180,000 m^3
Koyazuka	Roof support post	0.4 m^3	180,000 m^3
Moya	Purlin	0.7 m^3	643,000 m^3
Taruki	Rafter	0.5 m^3	225,000 m^3
Munagi	Ridge beam	0.1 m^3	45,000 m^3
Sub-Total	**Roof System**		**1,273,000 m^3**
Total			**7,104,000 m^3**

Notes: 1 *tsubo* equals 3.3 square meters or 35.5 square feet

7.0 NICHE OPPORTUNITIES FOR ALASKAN FOREST PRODUCTS IN JAPAN

7.1 RESIDENTIAL CONSTRUCTION

The Housing Quality Assurance Act of 2000 requires that all builders provide a 10 year warranty on their homes, including the structural components used to frame the house. This requirement has had a significant impact on the species of lumber specified for structural components that are used in ground contact applications. In the future, Japanese builders are expected to increase their use of naturally durable timber species in an effort to reduce their liability and increase the performance of their homes. A second factor influencing material specification in residential construction has been the homebuyers increasing awareness of, and concern about, "sick house syndrome". Sick house syndrome has received extensive coverage within the Japanese media and, while it is primarily attributed to off-gassing of Volatile Organic Compounds (VOCs) from carpeting, paint and vinyl wall coverings and their adhesives, this concern on the part of some homebuyers has caused a growing number of builders to reduce or discontinue their use of engineered wood products and pressure treated wood.

The combination of these two factors provides Alaskan sawmills with a unique opportunity to increase their sales of Alaska yellow cedar lumber in both the post and beam as well as the 2x4 segments in the home building industry. However, capitalizing on this opportunity requires that Alaskan sawmills understand the specific needs and technical requirements of residential builders in both of these housing segments. In particular, Alaskan lumber manufacturers must recognize the unique product specifications required in both the post and beam and the 2x4 segments of the industry and be willing to supply lumber products that meet Japanese builders needs and specifications.

7.1.1 The Post and Beam Market Segment

Builders use of individual species for specific end-uses have changed substantially since 1998, Table 7.1. For example, the use of treated hemlock *dodai* has dropped by fifty percent from 1998-2001 while Alaska yellow cedar use jumped from 11.2% to 23.1% over this same period. Similarly, the use of glue-laminated lumber for *dodai* increased from 0.2% to 15.9%. It is estimated that about 40-50% of the glu-lam *dodai* utilize yellow cedar lamina, with the remainder being split between hemlock, radiata pine, and European red pine. A recent survey of pre-cut post and beam manufacturers found that yellow cedar lumber was used for 20.4% of *dodai*, 0.9% of *kudabashira* (3 meter wall posts), and 0.9% of *toshibashira* (6 meter wall posts), Table 7.2.

Interviews with post and beam builders and pre-cut manufacturers found that these groups recognize that Alaska yellow cedar is the premier species for use in ground contact end-uses such as *dodai*, *obiki*, *tsuka*, and *neda*. However, the severe economic recession in Japan during the past five years has made builders extremely price conscious, while the deflationary trend in land and house prices has caused builders to look for ways to reduce material costs. Currently, solid yellow cedar *dodai* sell for ¥63,000 per cubic meter, while yellow cedar glu-lam *dodai* are priced at ¥98,000 per cubic meter, Figure 7.1. While their prices have dropped substantially over the past 18 months, they are still significantly more expensive than other species, Figure 7.1.

Table 7.1. Changing ground sill (*dodai*) material use within the post and beam industry.

Product	Species	2001 (%)	2000 (%)	1999 (%)	1998 (%)	Change '01/'98
Post	Glu-lam	71.5	60.2	66.2	60.8	+18%
(Hashira)	(Whitewood)	41.9	28.2	--	--	--
	Cypress	18.0	20.4	14.0	10.9	+65%
	Cedar	3.9	10.1	10.6	17.6	-78%
	Hemlock	--	1.9	4.5	4.2	-100%
	Other	6.7	7.4	4.6	6.4	+5%
Structural Beam	Douglas-fir	38.7	52.8	62.6	59.0	-34%
(Hirakaku)	KD Solid	28.9	38.7	37.9	24.7	+17%
	Glu-lam	56.3	36.4	29.0	27.4	+105%
	(Whitewood)	19.8	17.8	12.6	8.6	+130%
	(DF)	10.0	6.2	7.1	12.8	-22%
	Eur. Redwood	16.0	6.0	--	--	--
	Other	5.1	10.8	8.5	13.6	-63%
Sill Plate	Hemlock	36.0	37.5	54.5	72.1	-50%
(Dodai)	Yellow cedar	23.1	17.8	19.5	11.2	+106%
	Cypress	13.1	19.0	9.3	11.3	+16%
	Glu-lam	15.9	12.9	6.0	0.2	+785%
	Other	11.9	12.8	10.7	5.1	+133%

Source: Japan Lumber Reports 2002, No. 366

Table 7.2. Summary of Alaska yellow cedar use within the Japanese pre-cutting industry, 2000.

	Dodai	***Kudabashira***	***Toshibashira***
% YC specified	20.4%	0.9%	0.9%
Lumber use per home	0.8 m^3	1.7 m^3	0.7 m^3
Reported annual material use	45,692.0 m^3	3,062.0 m^3	1,375.0 m^3

Note: Survey results based on responses of 277 companies that reported using Alaska yellow cedar in their manufacturing process.

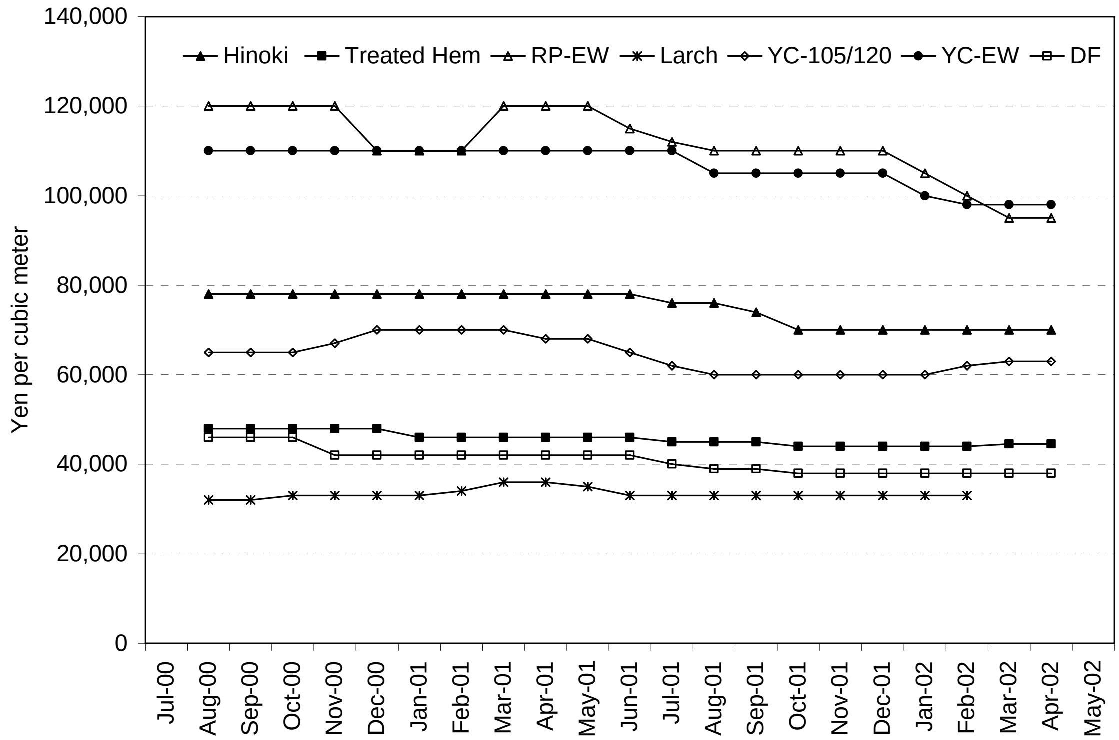

Figure 7.1. Prices for *dodai* products in Japan.
Units: ¥ per cubic meter

Another opportunity exists for increasing the use of Sitka spruce for a wide range of products used in post and beam construction. To capitalize on this opportunity, Alaska sawmills will need to emphasize the unique advantages of Sitka spruce, including its high strength to weight ratio, dimensional stability, and the high quality of the slow-growth Alaska Sitka spruce (primarily attributed to the narrow growth rings). This species is particularly well known in the northern region of Japan (Hokkaido and the Tohoku region) already. In contrast to Alaska yellow cedar, which has its greatest opportunity in ground contact applications because of its superior durability and dimensional stability, Sitka spruce can be used in just about any end-use application within the post and beam industry. This flexibility will become useful for sawmills looking to maximize their return from Sitka spruce logs, and allow them to produce high quality lumber for the *shoji* industry (as discussed later) while providing a market opportunity for lower quality lumber as posts or lamstock for glu-lam lumber.

The price data in Figure 7.1 suggests that the Japanese market implicitly recognizes three sets of *dodai* products. The first set of products is Alaska yellow cedar glu-lam and treated radiata pine glu-lam lumber. Glu-lam lumber is generally recognized to be a superior product to solid sawn lumber in terms of its higher strength characteristics and greater dimensional stability. While these products are both perceived as being superior to solid sawn lumber, they are readily differentiated by the fact that the Alaska yellow cedar product is naturally durable, while the radiata pine product requires a preservative treatment. This important factor should allow Alaska sawmills to effectively differentiate their product from radiata pine and, if properly promoted to Japanese builders and home buyers, support an increased price premium relative to radiata pine, particularly given the interest of homebuyers in the Healthy House concept. The recent increase in Alaska yellow cedar glu-lam prices relative to treated radiata pine may be a reflection of changing builders perceptions of the relative value of the two products.

The second set of *dodai* products includes solid sawn Japanese hinoki and Alaska yellow cedar. While both of these products are naturally durable, there is a general perception among Japanese builders that Alaska yellow cedar is superior to Japanese hinoki because it is more dimensionally stable and less prone to twisting and bending over time. While Japanese hinoki *dodai* sell for a higher price than Alaska yellow cedar *dodai,* this is more an artifact of exchange rates and the very high harvesting and sawmilling costs in Japan.

The third set of *dodai* products are the lowest priced, and are generally perceived by builders as having the lowest durability and strength characteristics. This third set of products includes treated hemlock from North America, treated Russian larch, and North American Douglas-fir (both treated and un-treated). These products are viewed as being acceptable for *dodai* applications and primarily used by builders looking for ways to keep their material costs down.

Despite its numerous advantages over other species, many builders indicate that they are reluctant to specify Alaska yellow cedar because of its high price. The advantages of using Alaska yellow cedar include higher durability, greater dimensional stability, lower tendency to split and crack, higher density, and a reduced tendency to twist. From a quality and durability perspective, Japanese builders' and pre-cutters' focus on price would seem to be a classic example of being penny-wise and pound-foolish.

To highlight this point, consider the following. The average 30 *tsubo* house (1,065 square feet) requires approximately .8 cubic meters of lumber for the *dodai*, Table 3.1. Specifying solid sawn Alaska yellow cedar lumber over treated hemlock would increase the total cost of this house by just ¥18,500 (or $150). In addition, since the average 30 *tsubo* house also uses .2 cubic meters each for the *tsuka* and *obiki*, and .7 cubic meters for the *neda*, the total volume of lumber used for ground contact members is approximately 2 cubic meters. Thus if a builder were to specify Alaska yellow cedar for all of the ground contact members in the house, they would increase the cost of the house by around ¥35,150 (or $285) ***in total***. While the price of homes varies substantially in Japan, as in the US, it is not unreasonable to expect that a 30 *tsubo* single family detached house outside of Tokyo would be priced in the ¥20,000,000 - ¥25,000,000 range ($160,000 - $200,000), excluding land. Thus, specifying Alaska yellow cedar in place of treated hemlock would increase the price of a house by less than one-half of one percent of the final price. From a marketing perspective, the challenge is to help Japanese builders demonstrate to home buyers that the increase in value of a home built using Alaska yellow cedar substantially exceeds the increased costs associated with using higher quality lumber.

7.1.1.1 Technical Specifications

The primary sizes for the main groundsill components are listed in Table 3.1. Japanese builders and pre-cutters require that suppliers of finished components meet extremely tight tolerances. Size tolerances on cross-section dimensions are generally +1mm with no leeway for undersizing. Similarly, lengths may exceed the specified dimension by up to 1mm. Yellow cedar ground sills, girders, and joists are generally required to be planed and kiln-dried to a moisture content of 20% or less. In addition, most builders and pre-cutters do not want sapwood and generally specify that components be free of heart center (FOHC; i.e., no pith or juvenile wood). Finally, the components should be straight with no twist or warp and should not have any wane (bark) on the lumber edges. Acceptable knot size varies by end-use, although most customers tend to require small, sound knots less than one inch in diameter. It is useful to note that while builders and pre-cutters specify no twist or warp in the lumber, they are generally willing to accept a small amount of these defects. These pieces are usually sorted out and cut up into small, straight components for *tsuku* (floor posts) and *dodai-hiuchi* (corner bracing for the sill plate).

For manufacturers lacking the capability to produce lumber that meets the tight tolerances required by Japanese pre-cutters and builders, there are other options for serving the Japanese market. One option is to produce cants for Japanese sawmills. In general, Japanese customers require that cants be at least 5 inches thick, although they tend to prefer cants that are 8 inches or greater in thickness. Since this product can vary substantially between Japanese mills, there are no standard sizes for cants. A second option is to send the logs to the mainland US for processing to the particular sizes and specifications of the Japanese.

At this point it might be useful for the reader to see some of the products and end-uses that have been described. Builders and pre-cutters generally utilize a wide variety of species and products for *dodai*, Photos 7.1 and 7.2. While pressure treated hemlock remains the most commonly used species for *dodai* applications, its use has declined substantially since 1998. As builders have shifted away from hemlock, the use of Alaska yellow cedar, hinoki (Japanese cypress), and preservative treated European red pine glu-lam has increased rapidly. Other species that are occasionally used for *dodai* include radiata pine, Russian larch, and Douglas-fir. Yellow cedar blanks are loaded onto a conveyor belt and tagged with a bar code that is read by a computer scanner, Photo 7.3. The bar code identifies what type of component is to be machined from the blank and the correct machining head is rotated into position and the correct joint is pre-cut from the blank, Photo 7.4. After the component is shaped, decorative posts that are used in the exposed post type of construction are lightly planed to remove any surface blemishes, Photos 7.5 and 7.6. The finished components for each house are collected together in small bundles and stacked together in preparation for shipping based on the architectural drawings and blueprints, Photos 7.7 and 7.8. The structural components for the typical 30-35 *tsubo* house can easily be loaded onto two small trucks for transport to the job site, Photo 7.9. At the jobsite, the *dodai* are bolted onto the foundation and the pre-cut components are assembled together to frame out the house, Photos 7.10 and 7.11.

Photo 7.1. Various *dodai* lumber products at pre-cutter's plant.

Photo 7.2. European redwood glue-laminated lumber is now treated and used for ground sills.

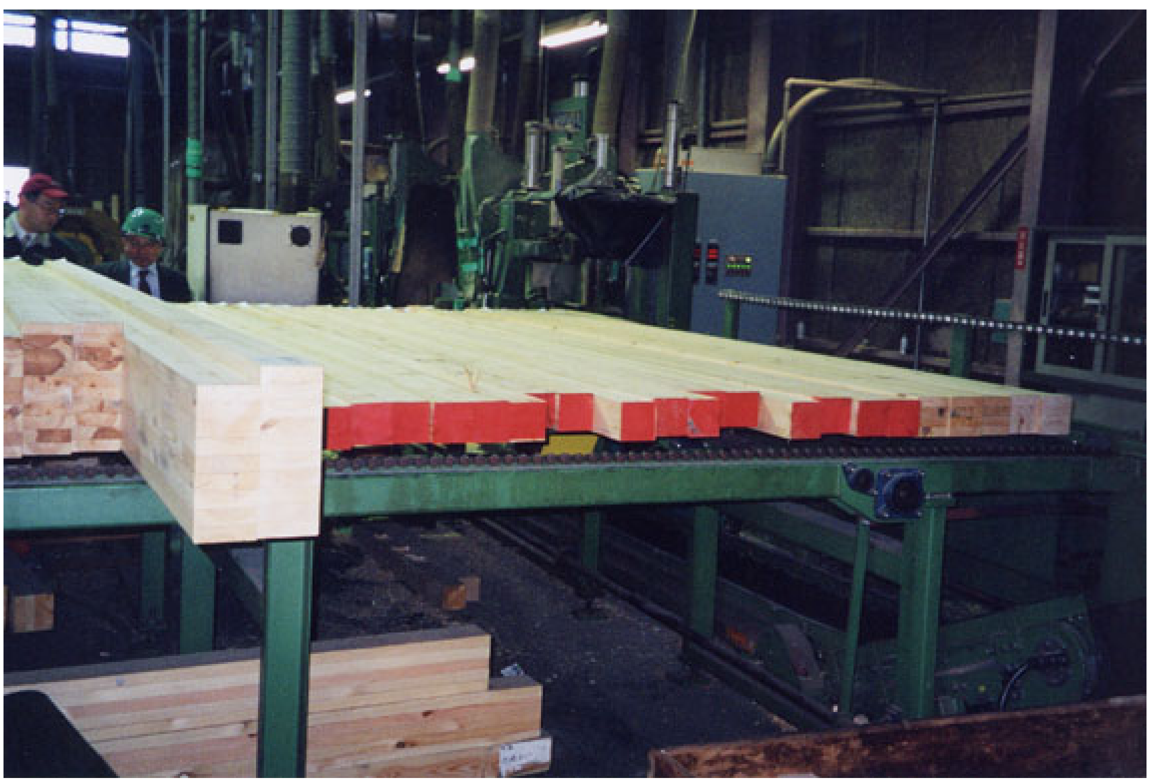

Photo 7.3. Yellow cedar *dodai* blanks (red ends) prior to machining.

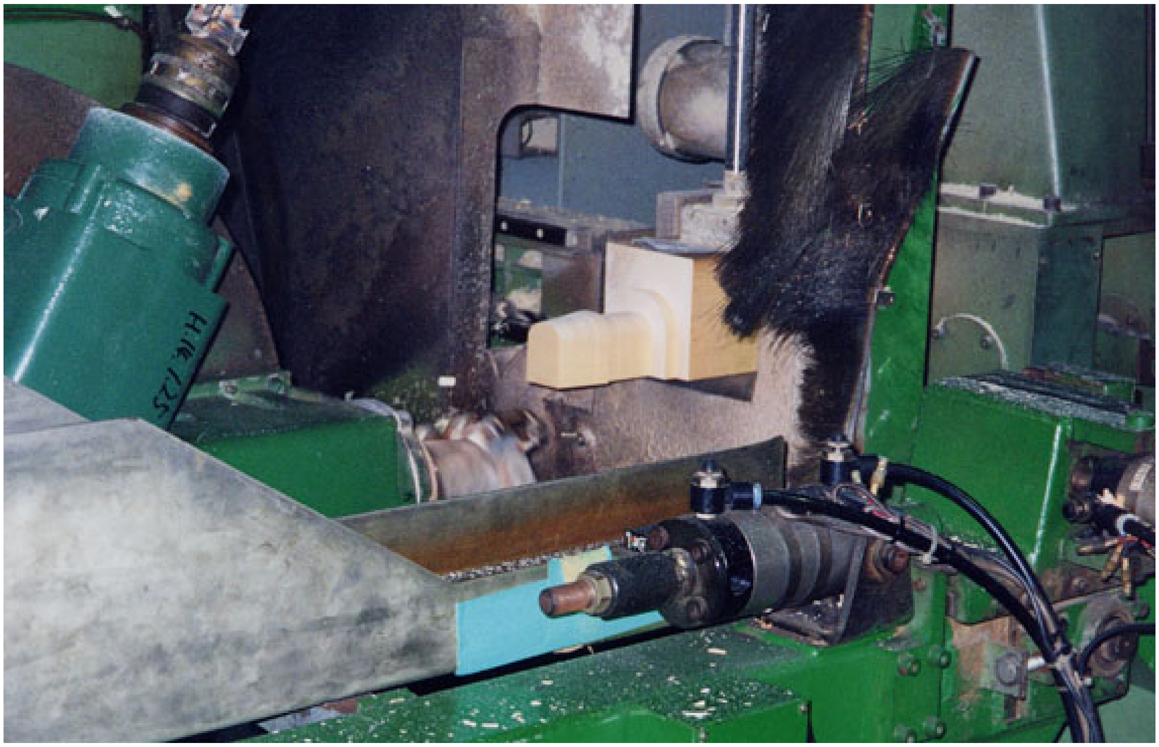

Photo 7.4. Yellow cedar *dodai* blank being shaped.

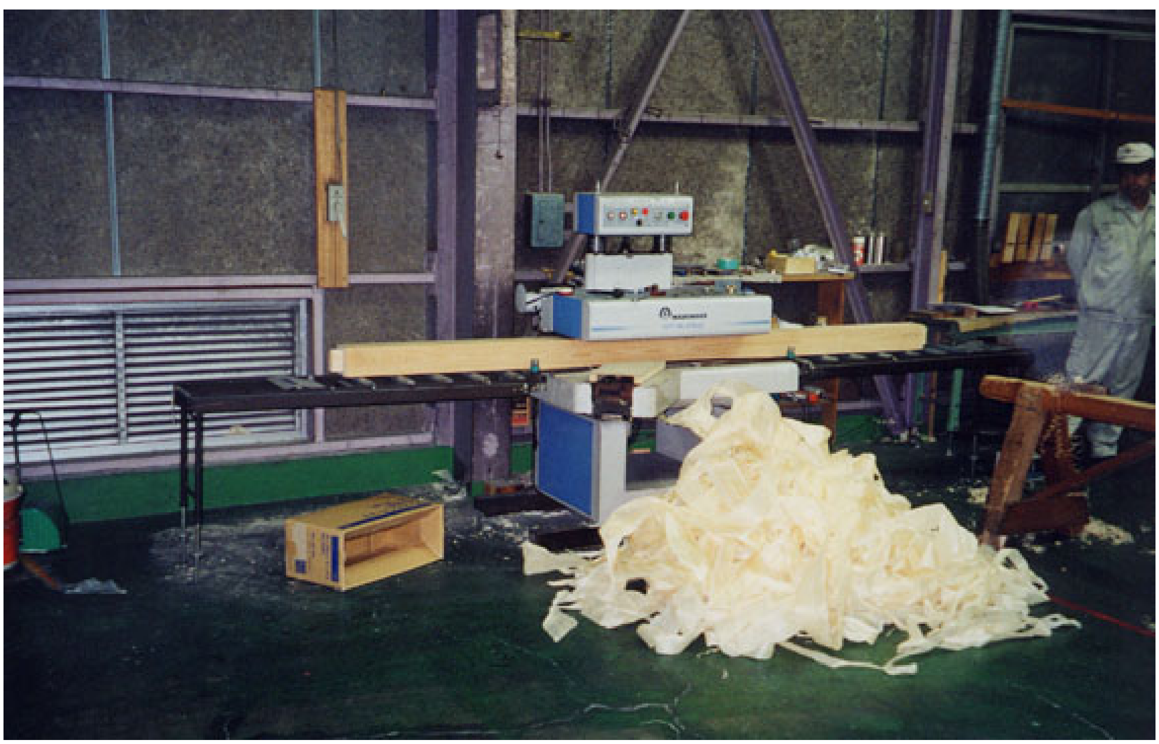

Photo 7.5. Yellow cedar wall post (*hashira*) being planed.

Photo 7.6. **Yellow cedar *dodai* following machining process.**

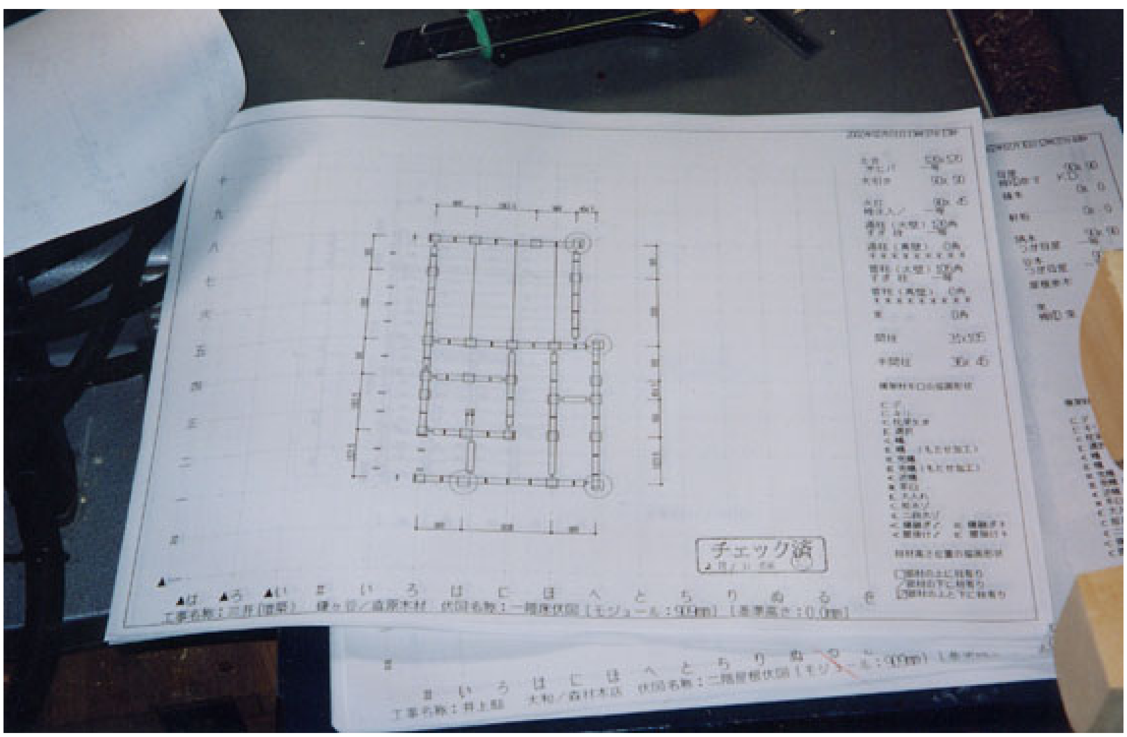

Photo 7.7. **Blueprint of foundation system with location and specifications of each *dodai* component.**

Photo 7.8. Yellow cedar *dodai* as a component of a pre-cut housing package.

Photo 7.9. The structural components for the typical 30 *tsubo* post and beam house can be delivered in two truck loads.

Photo 7.10. Yellow cedar *dodai* and *hashira* in post and beam house.

Photo 7.11. Yellow cedar wall framing and door framing.

7.1.2 The 2x4 Market Segment

Similar to the post and beam segment of the residential construction market, an opportunity exists to greatly expand the use of Alaska yellow cedar lumber as sill plates in 2x4 houses built in Japan. Currently, most 2x4 houses use treated hemlock or SPF lumber for sill plates, although European whitewood (white spruce), European red pine, and treated radiata pine are used to a limited extent. Similar factors, such as the 10 year housing warranty and homebuyers' interest in the Healthy House concept, should help to expand yellow cedar use in the 2x4 market segment. The 2x4 segment of the housing industry has been the most resilient over the past four years, showing modest declines in total housing starts but gaining market share relative to the other types of wooden construction, Figure 2.3. Two by four housing starts in 2001 totaled 77,235, a sizable number considering that virtually all of the structural lumber used to build these houses is imported. While most builders use 2x4s and 2x6s for ground sills (depending on the lumber size used to frame the walls), some builders prefer to use 90mm x 90mm and 105mm x 105mm squares for ground sills.

Opportunities also exist for other Alaskan species in the Japanese 2x4 market. Species such as Sitka spruce and white spruce could easily be used, although structural lumber must have an approved grade stamp to be used in this market. Another potential barrier relates to the large volume of dimension lumber being exported into Japan from Canada. Given that the US has imposed a substantial duty on Canadian lumber exports into the US, many Canadian sawmills have increased their exports of dimension lumber into Japan, driving down prices in that market.

7.1.2.1 Technical Specifications

In general, most builders are looking for J grade dimension lumber (2x4 and 2x6 sizes) for sill plates. While many builders in Japan continue to use green lumber for *dodai* applications, a number of urban and suburban builders prefer to use kiln-dried lumber because it is more dimensionally stable than green lumber. While dimensional stability is not usually a problem with Alaska yellow cedar, providing kiln dry lumber can be an important selling point for some builders. Typical lumber specifications required by Japanese 2x4 builders for yellow cedar ground sills include kiln-dried (moisture content less than 20%), J grade, free of heart center (FOHC), no sapwood, planed (smooth four sides-S4S), end coated lumber (to prevent splitting), no wane, and minimal warp and twist. Unfortunately, we were unable to obtain pricing information for yellow cedar dimension lumber in Japan (because there is little demand for this product today), although the current price for random length, J grade, hemlock or SPF 2x4, 2x6, and 2x8s is ¥34,000 per cubic meter, while the price for European whitewood dimension lumber is ¥33,000 per cubic meter.

With respect to dimension lumber used for structural framing applications, most builders prefer kiln dry lumber because it is more dimensionally stable. This is particularly important in wall systems where a twisted piece of lumber can cause nail pops or bulges in the wall, resulting in costly (both in terms of cost and reputation) call-backs and repairs.

7.2 LAMINA FOR GLUE-LAMINATED BEAMS

Currently there are only six glu-lam beam manufacturers in Japan that utilize Alaska yellow cedar lumber to produce laminated *dodai* and posts. It is estimated that the total production of yellow cedar glu-lam beams was less than 20,000 cubic meters in 2001, although the manufacturers that we talked with indicated that production of yellow cedar glu-lam beams has been increasing rapidly since 1999. Some builders and pre-cut manufacturers prefer using yellow cedar glu-lam beams over solid sawn lumber because glu-lam beams are straighter and do not twist, bend, warp, or split in service. The price data displayed in Figure 7.1 shows that yellow cedar glu-lam ground sills enjoy a significant price premium over solid sawn lumber *dodai*. As a result, yellow cedar glu-lam *dodai* tend to be used in higher end homes although some builders of mid-price homes use yellow cedar glu-lam *dodai* as a way of demonstrating the high quality of their houses and differentiating their homes from their competitors. Yellow cedar *dodai* and *hashira* (posts) are usually made with 4 or 5 lamina using a colorless resin that produces an inconspicuous glue line, Photo 7.12. Most glu-lam manufacturers in Japan have quality control and mechanical testing facilities in their plants and are allowed to apply the JAS (Japanese Agricultural System) grade stamp in-house, Photo 7.13. Glu-lam manufacturers currently import a substantial volume of yellow cedar lamina and several have indicated that they expect that their production of yellow cedar glu-lam will increase in the future, suggesting that imports of yellow cedar lamstock will increase as well, Photo 7.14. It should be noted that the potential exists for glu-lam production and export from Alaska and the mainland US to Japan, although there are a number of regulatory and technical constraints that would need to be resolved first, including gaining product approval under the Japanese Agricultural System (JAS).

In addition to ground sills, there are also opportunities to export lamstock produced from Sitka spruce and hemlock for use as posts (*hashira*) and structural beams (*hirakaku*). This is particularly true because Alaskan timber species tend to be slow growth with narrower growth rings and correspondingly higher strength characteristics than the same species growing in other parts of the Pacific Northwest.

7.2.1.1 Technical Specifications

Discussions with two glu-lam manufacturers were conducted to identify the technical specifications required for lamstock in Japan. Lamstock is generally not end coated and is specified in both random and uniform lengths. Lamina can be supplied as green lumber or kiln-dried lumber. Green lumber used for four ply 120mm x 120mm glu-lam should be 38mm x 130mm, FOHC, and minimal wane, although it can have a small amount of sapwood included. It should be L3 lamstock grade (as specified in the WWPA lumber grading rules) or higher, and the preferred lengths are 3 and 4 meters, although 2.6 and 3.5 meter lumber is also used. The approximate price for green yellow cedar lamstock in February 2002 was ¥50,000 per cubic meter. Green lamstock used for five ply 120mm x 120mm glu-lam should be 32mm x 130mm in size.

The technical specifications for kiln-dried lamstock used for 4 ply 120mm x 120mm beams are 34mm by 128mm, with a moisture content of 12% or less. The lumber should be L3 lamstock grade (as specified in the WWPA lumber grading rules) or higher. The primary lumber lengths are 10 feet (3 meters) and 14 feet (4 meters), although the following lengths are sometimes used as well: 6 feet, 8 feet, 12 feet, 13 feet, 15 feet, 16 feet, 18 feet, and 20 feet. Lumber can be supplied in either uniform lengths or random lengths. The lamstock should be planed and S4S, FOHC, with no wane (although some wane is allowed). The approximate price for kiln-dried yellow cedar lamstock in February 2002 was approximately ¥60,000 per cubic meter. Kiln-dried lamstock used for five ply 120mm x 120mm glu-lam should be 28mm x 128mm in size.

Photo 7.12. Alaska yellow cedar glu-lam beams prior to entering the hot press.

Photo 7.13. Four-ply Alaska yellow cedar glue-laminated *dodai* with the JAS grade stamp.

Photo 7.14. Alaska yellow cedar lamstock in the yard of a Japanese glu-lam manufacturer.

7.3 LUMBER FOR *SHOJI* COMPONENTS

Traditional Japanese homes typically have a *tatami* room within them, Photo 7.15. The *tatami* room may be where the family gathers or it may serve as a bedroom at night. *Tatami* rooms use a large volume of appearance grade wood in exposed applications such as beams, *shoji* screens, and moldings. While there are fewer *tatami* rooms being built in Japanese homes today, there is still a good demand for high quality yellow and red cedar, Sitka spruce, and white spruce for *shoji* components. In addition, the price premiums obtained for *shoji* grade lumber make this a good market for lumber manufacturers. In February 2002, *shoji* manufacturers were paying substantial price premiums for the higher grades of Alaska yellow cedar, western red cedar, Sitka spruce, and white spruce lumber used in *shoji* products. For example, *shoji* manufacturers pay approximately ¥360,000 per cubic meter for 36mm thick rough, green, clear Alaska yellow cedar lumber with a length of 1.9 meters. Prices for clear 5 inch thick Alaska yellow cedar cants were ¥195,000 per cubic meter in September, 2002 while clear Sitka spruce cants were selling for ¥210,000 per cubic meter, and western red cedar cants were priced at ¥138,000 per cubic meter.

As mentioned earlier, a growing volume of yellow cedar lumber is beginning to be imported by *shoji* manufacturers from Taiwan, Photos 7.16 and 7.17. Rough cut green or kiln-dried lumber is first planed to facilitate the grading process. The planed lumber is then kiln-dried to a moisture content of 12% before being cut into component sizes, Photos 7.18 and 7.19. The production process within the *shoji* industry is still highly dependent upon manual labor (Photo 7.20), and *shoji* products are still regarded as high quality handcrafted wood products that enhance the aesthetically pleasing environment of the *tatami* room, Photos 7.21 and 7.22.

7.3.1.1 Technical Specifications

Shoji manufacturers typically use small dimension lumber for their products. As a result, they are able to utilize lumber sizes down to 36mm x 36mm with a length of 900mm. The typical widths that they use are 36mm, 90mm, and 120mm. Standard lumber lengths for vertical *shoji* components are 1,900mm and 2,000mm while horizontal lumber lengths are typically 900mm. While *shoji* manufacturers would prefer the widths mentioned earlier, they are willing to purchase random width lumber as long as the thickness of the lumber is 36mm.

Shoji manufacturers tend to be very aggressive about specifying lumber with very few visual defects. They are willing to purchase rough, green lumber, but generally want lumber that is free of heart center and with virtually no wane or sapwood. Knots, even very small pin knots, are unacceptable, as is any type of included bark or mineral stain. *Shoji* manufacturers prefer to purchase planed lumber over rough sawn lumber so that they can more easily identify visual defects in the lumber. Having said this, Japanese *shoji* manufacturers are willing to pay a substantial premium for high quality lumber. In September 2002, the price for rough, green Alaska yellow cedar lumber with dimensions 36mm x 36mm x 900mm, was ¥210,000 per cubic meter, while the price for 1,900mm lumber with the same cross-section dimensions was ¥360,000 per cubic meter.

Given the high value placed on the appearance of the lumber used in *shoji* products, manufacturers and consumers are very sensitive to even minor defects in lumber. In fact, a piece of lumber that has no defects on the face can be rejected because of a small mineral stain on the back surface of the lumber, Photos 7.23-7.25. While this focus on defect-free lumber has helped to maintain high prices for lumber, it also means that lumber manufacturers must identify markets for the large volume of lower quality lumber that is unacceptable to *shoji* manufacturers. These lower grades of lumber can easily be used to produce structural components (e.g., posts and beams) or lamstock. It also means that *shoji* manufacturers are extremely aggressive about pressing claims against lumber that does not meet their visual standards. For example, one *shoji* manufacturer in western Japan indicated that approximately 15% of the yellow cedar lumber he purchases from Taiwan is ultimately rejected because of visual defects. The value of these defects is generally applied against the value of future contracts and ultimately reduces the net price that lumber manufacturers receive for their product. As a result, while *shoji* manufacturers are willing to purchase unplaned lumber, they would greatly prefer to purchase planed lumber so that it is easier for them to identify visual defects in the lumber. The high visual quality standards for lumber within the *shoji* industry means that while the prices paid for lumber by *shoji* manufacturers are high, lumber manufacturers need to perform a careful assessment of their production capabilities, visual grading, and quality control systems before entering this market to ensure that they can meet the high expectations of *shoji* manufacturers.

Photo 7.15. Interior view of a Japanese home utilizing *shoji* components manufactured from Sitka spruce.

Photo 7.16. Yellow cedar rough cut lumber from Taiwan for use by a *shoji* manufacturer.

Photo 7.17. Yellow cedar rough cut lumber for *shoji*.

Photo 7.18. Yellow cedar *shoji* components are planed and graded.

Photo 7.19. Even small yellow cedar off-cuts are used by *shoji* manufacturers.

Photo 7.20. ***Shoji*** **screens typically require a large amount of hand labor to produce.**

Photo 7.21. Completed *shoji* screens in inventory prior to receiving paper overlays.

Photo 7.22. ***Shoji*** **products are still expected to provide a traditional and artistically dramatic effect to the *tatami* room.**

Photo 7.23. The next series of pictures illustrates that even minor defects in Alaska yellow cedar lumber are graded out by *shoji* manufacturers.

Photo 7.24. The *shoji* manufacturer rejected this Alaska yellow cedar lumber.

Photo 7.25. Small defects result in claims against future contracts with lumber suppliers.

8.0 SUMMARY OF A SURVEY OF S.E. ALASKAN SAWMILLS

8.1 SURVEY OF SAWMILLS IN ALASKA

Alaska sawmill demographic and productivity information was compiled by Hill (1998) for the Alaska Department of Community and Economic Development (DCED) through a survey of sawmills in 1995. Of 112 sawmills surveyed, 46 returned completed surveys, providing a 41.1% response rate. The results of the survey suggest that small firms with low production volumes and limited processing capability dominate the sawmill industry. Of the mills responding to the survey, 50% employed less than 4 people, 90% employed fewer than 25 people, and only two required more than 40 people to operate at full capacity. Many of the smaller mills may be part time or seasonal operations that do not operate when market demand is low. Survey results indicate that 86% of Alaska's lumber production and 100% of export lumber production occurs in Southeast Alaska. Dimension lumber comprises 69% of the total domestic production, while cants/flitches represent 56% of total export production. Statewide, the maximum production capacity of the sawmills surveyed for an eight-hour shift is 593,000 board feet. Southeast Alaska contains 78% of the state's sawmill capacity with 462,000 board feet produced per eight-hour shift.

Sawmills in competing regions, such as the PNW, typically produce 100 million board feet of lumber per year and employ 100 or more workers. Alaska's harvest restrictions and expansive geography cannot support mills of this size, and according to a study by Robertson and Brooks (unpublished report), their production costs are higher than in other regions. Thus, to be competitive on such a small scale, Alaska mills must be customized to serve niche markets. Alaska processors will need to make investments in their wood processing facilities in order to increase their competitiveness. In Alaska, the most common primary breakdown headrig is the circular saw followed by the bandsaw (Hill 1998). The often remote location of sawmills influences the style of headrig used. While less efficient, circular saws are often preferred in these locations because they require less technical support and are easier to repair and maintain. However, the use of circular saws substantially reduces lumber recovery and increases production costs. The changing timber resource in Alaska will almost certainly require sawmills to re-tool, processing smaller diameter second growth logs. Installing more efficient processing equipment could also allow sawmills to upgrade their operations and manufacture competitive products targeted at niche markets.

The lack of kiln drying facilities also precludes Alaska from many segments of the export and domestic markets. Of the sawmills surveyed, 16 reported some capacity for air-drying their lumber, three had dehumidification kilns, and only two operated dry kilns. While several sawmills in Southeast Alaska have indicated plans to improve or install dry-kiln capacity, dry kilns and storage sheds will be necessary to remain competitive in the export market, particularly in Japan.

8.2 SURVEY OF SAWMILLS IN SOUTH EAST ALASKA

A survey of 19 sawmills in SE Alaska was conducted during the spring of 2001 to identify their processing characteristics, raw material requirements and sources, product mix (by species), and markets (Housley, Kilborn, and Parrent, unpublished report). The survey was a census of all sawmills in SE Alaska that produced over 250,000 board feet of lumber in 2000 and this sample represents over 70% of the lumber production capacity in this region. A summary of the survey results is presented in Tables 8.1-8.4.

Total lumber production capacity for the sawmills in SE Alaska reached 438 million board feet in 2000, Table 8.1. The average production capacity for sawmills in SE Alaska was 23 million board feet, although this figure was skewed by four sawmills with production capacities in excess of 50 million board feet per annum. A simple analysis of the survey data shows that the seven smallest sawmills have an average production capacity of just 3.7 million board feet annually, while the eight mid-sized sawmills have an average production capacity of 21.1 million board feet annually. In contrast, the four largest sawmills can produce 61.2 million board feet annually at full production. In other words, the four largest sawmills represent 55.8% of total lumber production capacity in SE Alaska, while the ten smallest sawmills represent just 15% of total lumber production capacity.

Table 8.1. Summary of sawmill production data for SE Alaska in 2000.

	Total	Average
Estimated mill capacity (log scale, mbf)	438,475	23,077.6
Actual mill production (log scale, mbf)	87,117	4,585.1
Mill employees	321	16.9

Table 8.2. Raw material sources for SE Alaska sawmills in 2000.

National Forest	Other Federal	State of Alaska	Private Native	Private Other	Import	Total
Volume (log scale, mbf)						
152,238	0	7,717	275	398	0	160,628
Percent breakdown						
94.8%	0	4.8%	0.2%	0.3%	0	100%

Table 8.3. Volume of production in SE Alaska in 2000, by product type and species.

Product	Sitka Spruce	Hemlock	Western Red Cedar	Alaska Yellow Cedar	Total
Lumber	13,761.2	36,191.6	6,176.2	1,827.6	57,966.5
Cants	10,196.3	10,560.3	312.7	761.1	21,830.5
Cants (sawn)	1,500.0	3,250.0	2,320.0	250.0	7,320.0
Subtotal	*25,457.5*	*50,001.9*	*8,808.9*	*2,838.7*	*87,117.0*
Chips (Utility logs)	4,793.0	22,059.0	0	0	26,852.0
Chips (Sawlog)	3,321.0	14,233.0	478.0	0	18,032.0
Subtotal	*8,114.0*	*36,292.0*	*478.0*	*0*	*44,884.0*

Note: Production of lumber and cants is measured in thousand board feet; Production of chips is measured in thousand board feet of roundwood inputs (either from utility grade logs or sawlogs).

Table 8.4. Markets for wood products from SE Alaska in 2000.

Product	Alaska	Mainland US	Canada	Pacific Rim	Total
Lumber	8,136	54,287	3,774	20,925	87,122
Chips	3,290	28,374	14,415	0	46,079
Logs	0	5,908	7,747	14,193	27,848
Subtotal	11,426	88,569	25,936	35,118	161,049

Perhaps more importantly, the survey data shows that these sawmills produced just 87.1 million board feet of lumber in 2000, or 19.9% of their total production capacity. Further analysis of the survey data shows that the seven smallest sawmills operated at 33.5% of capacity while the eight mid-sized sawmills operated at 19.6% of capacity, and the four largest sawmills operated at 18.6% of capacity. In other words, while the ten smallest sawmills represent just 15% of total lumber production capacity in SE Alaska, they generated almost one-quarter (22.8%) of the lumber produced in SE Alaska in 2000. It should be noted that the capacity utilization statistics are skewed by the fact that three of the mid-sized and one of the large sawmills produced no lumber in 2000.

The vast majority of the logs processed by the sawmills in SE Alaska are sourced from the National Forests, Table 8.2. Almost 95% of the logs processed by the sawmills came from the National Forest while just 4.8% were harvested from State of Alaska forests, 0.2% were from private Native Alaskan forests, and 0.3% were from other private forests. Clearly the health of the sawmill industry in SE Alaska is still highly dependent on the National Forests as a source of raw material inputs.

The breakdown of sawmill production by product type and species is summarized in Table 8.3. The production data shows that almost two-thirds of the sawmill production in SE Alaska was sawn lumber with the remaining being cants. In addition, the sawmills produced 44.9 million board feet (roundwood equivalent) of chips. The primary species being processed are hemlock and Sitka spruce, although western red cedar and Alaska yellow cedar are also important species. Whereas almost 75% of the hemlock, western red cedar and Alaska yellow cedar were sawn into lumber, the processing of Sitka spruce logs is pretty evenly split between sawn lumber and cants. Hemlock is the primary species for chip production, with approximately eighty percent of total chip production.

The primary market for SE Alaska wood products is clearly the mainland US, with almost 55% of total production being shipped there (Table 8.4). However, both the Pacific Rim countries and Canada are also important markets for wood products from SE Alaska. High transport costs restrict the volume of wood products sold within Alaska to less than 10% of total production.

Recent research by the Wood Utilization Center in Sitka, Alaska focused on the dry kiln capacity and trends within the Alaska sawmill industry (Nicholls and Kilborn 2001). This research, conducted in November of 2000, found that there were 12 dry kilns with a total capacity of 94,000 board feet operating in Alaska. In addition, there were five dry kilns with a capacity of 415,000 board feet that were idle. Finally, the survey found that another five dry kilns were being considered that would provide an additional 293,000 board feet of drying capacity. Of those kilns currently operating, only two (with a total capacity of 17,000 board feet) were located in Southeast Alaska.

Another recent study of lumber recovery in Alaska sawmills looked at seven sawmills in SE Alaska, six sawmills in South-Central Alaska, and ten sawmills in Interior Alaska (Kilborn 2002). The study found that the sawmills located in SE Alaska had the lowest lumber recovery factor, lowest mill overrun, and highest level of thickness oversizing. For example, the average lumber recovery factor (LRF) for SE Alaska sawmills was 6.02, compared to LRF values of 7.47 in South-Central Alaska and 6.83 in Interior Alaska. In contrast, the LRF for sawmills in the PNW region of the US is approximately 9.0. These production problems have been attributed to a combination of inefficient production technology, poor equipment maintenance, and poor alignment and adjustment of sawmill equipment. These problems not only impact the efficiency and competitiveness of sawmills in SE Alaska, they also reduce product quality.

8.2.1 Summary

The survey of sawmills in Southeast Alaska clearly indicates that the existing production capacity is underutilized. To a large degree this has been attributed to reduced harvest volumes in the Tongass National Forest. However, this supply constraint adversely affects the competitiveness of SE Alaska sawmills in Japan to the extent that potential Japanese customers conclude that the sawmills are unable to provide a reliable supply of lumber.

The survey also demonstrates that small and medium-sized sawmills with limited access to technology and capital characterize the sawmill industry in SE Alaska. These in turn affect the ability of sawmills to produce lumber that meets the stringent quality requirements of customers in Japan. It also affects the ability of these sawmills to meet new product requirements in the changing market for softwood lumber.

Having the capacity to produce kiln-dried lumber can increase the ability of sawmills to compete in markets that require or favor dry lumber. This is the case both in Japan (with the introduction of the 10 Year Housing Warranty System) and the mainland US (where there are increasing concerns about toxic mold on green lumber). Despite this shift in preference towards kiln-dried lumber, the sawmill industry in Southeast Alaska is poorly positioned to take advantage of the increased interest in kiln-dried lumber. New investment in dry kilns will be required to improve the competitiveness of sawmills in Southeast Alaska.

Given the constraints on resource supply, production technology, and capabilities that exist within the sawmill industry in SE Alaska, it is clear that they are unable to compete in the high volume, low margin market for commodity lumber products. In contrast, given the unique characteristics of Alaska wood species such as Sitka spruce and Alaska yellow cedar, there may well be niche markets in Japan where lumber products from SE Alaska could be competitive.

9.0 SOME FACTORS TO CONSIDER BEFORE EXPORTING

9.1 SOME ABC'S OF EXPORTING

One of the great misconceptions about exporting, particularly with smaller firms, is that they can try out a market for a while and, if export performance doesn't meet their expectations, they can simply withdraw from the market. This simplification overlooks the fundamental differences that exist between doing business domestically and doing business internationally and the fundamental expectations that foreign customers have regarding business relationships. In contrast to the US, business relationships in most other countries, particularly in Asia, are viewed as long-term relationships involving long-term commitments to work together. Leaving an export market, and ending business relationships, can adversely impact a company's ability to re-enter the market in the future. Because entering an export market is such a strategically important decision, a company needs to objectively evaluate their commitment to exporting and their ability to compete in the export market prior to entering a foreign market. Reviewing the following recommendations can help a manager evaluate their readiness to begin exporting.

A*ssess your market opportunity.* Nothing can help a company offset the risk of exporting like having access to good market information. Whether market information is obtained from prospective customers, prospective partners, other exporters, government agencies, or marketing consultants, it is important for a company looking to enter Japan to have developed a strategy for obtaining market information that they can use as the basis for developing their own marketing strategies. In particular, this information is critical in helping a firm considering the export decision to objectively assess the competitiveness of their products relative to Japanese lumber products, as well as lumber products being imported from other countries.

B*e committed to the export decision*. Most studies of export performance have found that a company can expect to lose money in an export market for the first two or three years. Since most US companies tend to plan and operate within a short-term time frame, managers have to adopt a new, longer-term perspective when operating in a foreign market. Thus, managers entering an export market must be prepared to accept losses as the short-term cost of establishing a profitable long-term export operation. Clearly, making senior management aware of this risk and having their complete support is critical to ensuring that the company can survive the difficult initial start-up period.

C*ommit the necessary resources*. Given that a company can expect to lose money during the first few years of exporting, managers must be aware of, and willing to accept, the risk that accompanies exporting. Since most small companies tend to be resource constrained, this is particularly true of financial resources, it is important that managers have a realistic understanding and expectation of the benefits and risks associated with exporting. Prior to deciding to export, it is important that the managers evaluate, identify, and commit the financial and managerial resources required to see the firm through the challenging first few years of exporting.

D*emonstrate your commitment*. Few forest products companies can expect to find that their current mix of products will match the needs of prospective customers in Japan. Japanese customers have different expectations and product specifications than domestic customers, and a sawmill must be prepared to make some modifications to the lumber that they want to export to Japan. At the very least they should be prepared to respond to Japanese concerns about lumber quality and metric dimensions used in the post and beam construction system. This is where good market information can help a company anticipate how their product fits into the Japanese market and what types of product modifications might be required for Japan. Exporters can also demonstrate their commitment to the market by working closely with their Japanese customers to ensure that the product specifications are clearly understood and accepted by both sides. In addition, exporters should consider inviting their Japanese customers to visit their manufacturing operations, and they should be prepared to visit their Japanese customers. These periodic visits help to strengthen the business relationship while providing tangible evidence of the exporters commitment. Finally, these visits provide the Japanese customer with a better understanding of your manufacturing capabilities while helping the exporter develop a better understanding of how their lumber products are being used.

E*xpect misunderstandings*. Managers must have a clear plan for how to deal with customer claims. Japanese customers are notorious for demanding high quality; therefore it is important that potential exporters have a quality control program in place to help reduce costly claims from customers. At the same time, claims happen, and a manager should be prepared to deal with these in a fair and equitable manner. This includes being prepared to visit the customer in Japan to resolve claims during the initial period of exporting.

F*ind the appropriate distribution channel strategy*. This depends on the size of the exporter and the extent to which they want to get involved in the Japanese market. The two most basic types of export distribution strategies are indirect exporting versus direct exporting. Distribution options for exporters range from working with a freight forwarder, selling through a US exporter or export consolidator, selling products to a Japanese trading company, to selling direct to Japanese pre-cut manufacturers or home builders. Since the choice of a distribution strategy often involves establishing a business relationship with a Japanese partner, this is a critically important decision for a company.

G*overnment agencies can help.* A final important consideration has to do with providing potential exporters with support services. These support services can help potential exporters understand, and be better prepared for, the intricacies of exporting. For example, information on the services that freight forwarders provide would be useful. Areas where potential exporters may need assistance include how to obtain and complete export paperwork, understanding the different types of export financing mechanisms available (e.g., irrevocable letters of credit vs. revocable letters of credit), how to conduct a business evaluation of potential partners or customers in Japan, how to handle complaints from customers, and basic business etiquette in Japan. For those companies that are either unable or unwilling to perform these services, establishing a relationship with a freight forwarder or export consolidator with extensive experience in Japan may be a good option.

10.0 STRATEGIC MARKETING RECOMMENDATIONS FOR ALASKA LUMBER MANUFACTURERS

This research has demonstrated that there are a number of potential market opportunities in Japan for softwood lumber from Alaska. These range from rough green lumber to planed and kiln-dried lumber to laminated yellow cedar sill plates. The most promising opportunities were found to be yellow cedar *dodai* for the post and beam market, 2x4 and 2x6 yellow cedar dimension lumber for sill plates in the 2x4 market, Alaska yellow cedar, Sitka spruce, and hemlock lamina for the laminated beam industry, and rough, green or planed, kiln-dried yellow cedar, western red cedar, Sitka spruce, and white spruce lumber for the *shoji* manufacturing industry. Having identified a series of market opportunities for softwood lumber from Alaska is not enough though. A more important factor is to provide sawmill managers in Alaska with a series of marketing recommendations that will allow them to objectively assess and determine if exporting softwood lumber to Japan makes strategic sense for their company and, perhaps more importantly, that will assist them in determining whether their company is prepared to make the commitment of time and resources that are critical to achieving success in the Japanese market. The strategic marketing recommendations developed during the course of this study are discussed in greater detail below.

1. Pre-qualify Alaskan sawmills for exporting to Japan.

While an earlier chapter provided a series of recommendations to be considered prior to entering the Japanese market, they are worth reviewing here. As described earlier, one of the great misconceptions about exporting, particularly with smaller firms, is that they can try out a market for a while and, if export performance doesn't meet their expectations, they can simply withdraw from the market. This simplification overlooks the fundamental differences that exist between doing business domestically and doing business internationally and the fundamental expectations that foreign customers have regarding business relationships. In contrast to the US, business relationships in most other countries, particularly in Asia, are viewed as long-term relationships involving long-term commitments to work together. Leaving an export market, and ending business relationships, can adversely impact a company's ability to re-enter the market in the future. Because entering an export market is such a strategically important decision, a company needs to objectively evaluate their commitment to exporting and their ability to compete in the export market prior to entering a foreign market. Answering the following questions can help a manager evaluate their readiness to begin exporting.

a) *Has the senior management of the company made a long-term commitment to exporting to Japan?*

b) *Are company managers risk-averse?*

c) *Has the company developed a strategy to acquire timely and accurate market information?*

d) *Is the company able and/or willing to adapt their product specifications to meet the needs of the Japanese market*.

e) *What is the appropriate channel for getting your product into the Japanese market?*

A final important component of pre-qualifying Alaskan firms has to do with providing potential exporters with support services. These support services can help potential exporters understand and be prepared for the intricacies of exporting. For example, information on the services that freight forwarders provide would be useful. Areas where potential exporters may need assistance include how to obtain and complete export paperwork, understanding the different types of export financing mechanisms available (e.g., irrevocable letter of credit), how to conduct a business evaluation of potential partners or customers in Japan, how to handle complaints from customers, and basic business etiquette in Japan. For those companies that are either unable or unwilling got perform these services, establishing a relationship with a freight forwarder who has extensive experience in Japan may be a good option.

2. Develop comparative performance properties of Alaskan wood species.

This report has focused on assessing market opportunities for a range of Alaska timber species: Alaska yellow cedar, western red cedar, Sitka spruce, white spruce, and hemlock. The market segment with the greatest potential is Alaska yellow cedar as *dodai* (ground sills) in post and beam construction. While there are currently a wide variety of lumber species and products used for *dodai*, none can match the performance and durability of Alaska yellow cedar. Yet in our discussions with post and beam pre-cutters and home builders, many were not aware of the benefits of using Alaska yellow cedar relative to other species and products. Perhaps more importantly, most seemed unaware of capitalizing on these benefits through marketing as a strategy to increase the perceived value of their homes and differentiate their homes from those of their competitors. Thus it is recommended that Alaska lumber manufacturers develop promotional material that clearly demonstrates the superior performance of Alaska yellow cedar in *dodai* applications. This can best be done by providing a comparison of the physical and mechanical properties of Alaska yellow cedar relative to competing species and lumber products. Some of the physical and mechanical properties that might be compared include:

Physical properties: durability, decay resistance, insect resistance, shrinkage, specific gravity, and moisture content.

Mechanical properties: compression strength parallel to the grain, compression strength perpendicular to the grain, and machinability.

Similarly, some of the species and lumber products that might be compared to Alaska yellow cedar include Japanese cypress (hinoki), preservative treated and untreated hemlock, preservative treated and untreated radiata pine, preservative treated and untreated Russian larch, preservative treated and untreated Douglas-fir, and preservative treated and untreated European spruce and red pine.

Providing comparative strength and durability information will be important in developing the market for lamstock lumber from Alaska. Since the continuing weakness of the Japanese economy has forced home builders to reduce their material costs, the wood products market has become increasingly global. While competitive prices are now important in Japan, it is essential to ensure that wood products meet the specifications of the Japanese market.

3. Trade mission to Japan for qualified Alaska lumber manufacturers.

Once a prospective exporter has been pre-qualified, it is useful to bring these companies to Japan on a trade mission. This provides an opportunity for potential exporters to attend trade shows, meet with prospective Japanese customers, see how their products would be used in Japan, and gain some familiarity with Japan, Japanese culture, and the Japanese business environment. A trip to Japan can provide the potential exporter with valuable experience and insights into Japan while providing a useful reference point upon which to base their final export decision. However, the development of business leads does not end with the trip to Japan. Oftentimes prospective Japanese customers are interested in visiting their partners' manufacturing facilities. Alaska manufacturers should be prepared for this in the event that the Japanese company requests a visit to Alaska.

4. Consider developing a marketing campaign promoting the benefits of Alaska yellow cedar to homebuyers in Japan.

The implementation of the 10 year Housing Warranty, in conjunction with increasing homebuyer interest in the Healthy House concept, suggests that a marketing program targeted to Japanese homebuyers and emphasizing the benefits of Alaska yellow cedar *dodai* could be successful in encouraging new homebuyers to specify Alaska yellow cedar *dodai* in both the post and beam market as well as the 2x4 market. Anecdotal information derived through interviews in Japan suggest that a similar marketing program, carried out using print advertisements displayed in subway cars through the greater Tokyo area, was successful in increasing demand for Aomori cedar in post and beam homes. It should be noted that several homebuilders already highlight their use of Alaska yellow cedar in ground sill applications in their marketing brochures (e.g., Yawata Homes, SxL Homes, and Sweden House). The promotional message should emphasize the major benefits of using Alaska yellow cedar in ground contact applications:

1. Alaska yellow cedar is a naturally durable species with a proven track record in Japan.

2. Alaska yellow cedar lumber provides a unique combination of durability and dimensional stability that helps ensure the long-term performance of the foundation system and reduces the shifting and settling of the house over time and exposure to the elements. "The long-term structural performance of a house is only as good as its foundation."

3. Alaska yellow cedar is naturally durable and resists both fungal and termite attack without the use of the toxic preservatives that are used to treat less durable timber species. In fact, since preservatives can only treat the outer shell of the lumber, Alaska yellow cedar lumber is much more durable than treated lumber.

4. A formal cost analysis should be undertaken to definitively determine the additional costs associated with the specification of Alaska yellow cedar ground sills. This information should be used to emphasize fact that specifying Alaska yellow cedar results in a minimal increase in the overall cost of a new home yet provides the homebuyer with substantial benefits in terms of increased durability and performance without the use of harmful chemical preservatives.

5. Consider promoting the idea of an Alaska yellow cedar ground contact foundation system.

Since durability and long-term performance are important to homebuyers and homebuilders, the US industry should consider promoting an Alaska yellow cedar ground contact foundation system. The foundation of the typical 30 *tsubo* (1,065 square foot) post and beam house consists of the floor post (*tsuka*), girder/sleeper (*obiki*), floor joist (*neda*), and ground sill (*dodai*), Figure 3.1. This idea has the dual advantage of improving the durability and performance of Japanese post and beam homes while increasing the volume of yellow cedar lumber used in the typical post and beam house from .8 cubic meters to 1.9 cubic meters. This program should emphasize the benefits to housing performance gained by not only specifying Alaska yellow cedar for ground sills but also for the other ground contact foundation members. The message should be that, from a performance and durability point of view, if a builder is going to use Alaska yellow cedar for the ground sills, then they should utilize it for all ground contact members.

The key to the long-term performance of a structure, with respect to termite and fungal attack, is to ensure that all ground contact components of the foundation are produced from a highly durable species like Alaska yellow cedar. This type of promotion should emphasize the association between the product used and benefits received, along the lines of *"The Foundation System of This House Was Built With Genuine Alaskan Yellow Cedar: The Naturally Durable Wood Species"***.** This promotional message would be included on all of the promotional literature associated with the house and could even include some type of certification for the foundation system. As discussed in the previous point, the promotional message would also emphasize the fact that with a minimal increase in the overall cost of the new home, the homebuyer would gain substantial benefits in terms of increased durability and performance in the foundation system without the use of harmful chemical preservatives.

6. Consider a co-marketing campaign with Japanese homebuilders.

There may be an opportunity to work cooperatively with some Japanese homebuilders to promote Alaska yellow cedar groundsill or ground contact foundation systems in both post and beam houses as well as 2x4 houses. While this would necessarily be a longer term type of project that would require a strong relationship between the exporter and Japanese homebuilder, it is an idea of how a sawmill and homebuilder could work together to develop a program that improves the competitive position of both partners.

7. Sawmills should carefully analyze market segments to ensure a good match with their production capabilities.

Alaska sawmills need to ensure that they analyze the Japanese market to identify those market segments that best match their existing production capability. For example, if a sawmill is currently cutting dimension lumber, they don't necessarily begin retooling their production process to produce metric size lumber for post and beam homes. However, they should also be looking for opportunities to increase their ability to service other market segments in the future by broadening their product mix and investing in new production technology, including dry kiln capacity.

8. Continue to expand the use of Alaskan species in the *shoji* industry.

Alaskan species have a strong reputation for quality within the Japanese *shoji* industry. However, concerns about price and the reliability of supply have led some *shoji* manufacturers to begin sourcing their raw material supplies from other regions. Despite the fact that the inclusion of *tatami* rooms in post and beam houses has been declining, the *shoji* market is still relatively large. More to the point, *shoji* manufacturers are still willing to pay a substantial price premium for high quality lumber. Alaskan manufacturers should look to expand the market for Alaska yellow cedar, western red cedar, and Sitka spruce cants, rough cut lumber, and planed lumber. Alaskan manufacturers should also begin to explore the possibility of introducing white spruce as an alternative species for *shoji* manufacturers. At least one *shoji* manufacturer outside of Tokyo has begun to import white spruce 2x4s for *shoji* production as a lower cost alternative to the more expensive traditional species. Alaska manufacturers may want to look at the grade recovery data for white spruce to see if there is a substantial component of the white spruce product mix that would be suitable for the *shoji* industry.

9. Explore the possibility of introducing Sitka spruce, hemlock, and white spruce as lamstock for glue-laminated posts and beams.

While this alternative may take some work to accomplish, in terms of developing the strength data required for structural components in Japan, it could pay off in the longer term. A substantial percentage of the laminated posts used in Japan are now produced from European whitewoods. During the course of our interviews with Japanese pre-cutters we found that there was considerable concern about the long-term durability of whitewoods in the Japanese climate. Many of the manufacturers we talked with indicated that they had begun to switch from European whitewoods to European redwoods because of this concern. Given this, it seems that there is a good opportunity for Alaskan manufacturers to substitute the more durable Alaskan species (hemlock, Sitka spruce, and perhaps white spruce) for European species. Obviously, more information on species strength and durability is required before this market opportunity can be pursued.

10. Investigate opportunities for Yellow Cedar and Red Cedar in products targeted to the R&R, DIY, and outdoor use markets.

Recent trends suggest that the repair and remodel (R&R), do-it-yourself (DIY), and decking/outdoor living markets have been growing in recent years in Japan, despite the general economic malaise. This growth is expected to continue and increase in the future. In order to gain a better understanding of these market segments, their potential for growth, and to identify opportunities for Alaskan wood products, it would be useful to conduct market research in Japan. This project would be designed to achieve the following objectives:

1. Describe the current R&R, DIY, and outdoor decking/outdoor living markets in Japan and project the growth of these markets to 2010,

2. Identify specific market opportunities for Alaskan wood manufacturers,

3. Describe marketing channels and pricing strategies for wood products in these market segments,

4. Describe technical specifications for wood products in these market segments, and

5. Provide a set of marketing strategies to assist Alaskan manufacturers to enter and compete in these market segments.

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