C I N T R A F O R

Working Paper

113

The Japanese Market for Laminated Lumber and Glulam Beams: Implications for Alaskan Forest Products

Joseph A Roos

Valerie Barber

Daisuke Sasatani

Ivan Eastin

July 2008

CINTRAFOR
Center for International Trade in Forest Products

C I N T R A F O R

Working Paper 113

The Japanese Market for Laminated Lumber and Glulam Beams: Implications for Alaskan Forest Products

Joseph A Roos

Valerie Barber

Daisuke Sasatani

Ivan Eastin

July 2008

Center for International Trade in Forest Products
College of Forest Resources
University of Washington
Box 352100
Seattle, WA 98195-2100

This report is based upon work supported by the University of Alaska and Cooperative State Research, Education and Extension Service, U.S. Department of Agriculture, under Agreement No. 2005-34158-16547. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture.

Executive Summary

The Japanese glulam beam market has been growing steadily since the early 1990's. From 1993 to 2007, total glulam beam usage increased from 199,300 cubic meters to 1,814,100 cubic meters. Japanese glulam beam supply comes from both domestic production and imports. In 2007, 65% of Japan's glulam beam production was from domestic manufacturers. However, even though these glulam beams are manufactured in Japan, much of the lamstock lumber used to produce glulam beams is imported. Two of the major imported lamstock species are European whitewood and Russian red pine.

Recently, a number of factors have combined to constrict the imported lamstock supply including a Russian log export tax, the increasing strength of the Euro and Canadian Dollar, and increased demand for wood in Europe and the Middle East. The researchers travelled to Japan and interviewed representatives from Japanese glulam manufacturing facilities. The company representatives were asked what species they are currently using for lamstock, technical specifications, market conditions, and what species they intended to use in the future.

The results of these interviews support the conclusion that there is potential for Alaska hemlock, Alaska yellow cedar, and Alaska Sitka spruce to supply Japan with lamstock lumber. However, the Japanese lamstock market requires that lamstock lumber be kiln dried and milled to exact metric dimensions. In order for Alaska forest products manufacturers to gain entry into the Japanese market, the following recommendations should be considered:

1. Organize workshops to teach Alaska sawmills about the technical requirements of the Japanese lamstock and glued laminated beam market.

2. Pre-qualify sawmills in Alaska that have the technical capability to produce kiln dried lamstock for the Japanese market.

3. Organize a trade mission to visit glulam manufacturers in Japan.

4. Display Alaska lamstock samples and literature at the Japan Home Show held annually in Tokyo.

5. Invite potential Japanese customers to visit sawmills in Alaska.

6. Create Alaska lamstock brands based on the established WWPA registered trademarks. For example, Alaska Hem Lam, Alaska Yellow Cedar Lam, and Alaska Sitka Spruce Lam.

7. In addition to lamstock, lamstock blanks could also be considered for export to Japan.

Table of Contents

List of Figures

List of Tables

1. Introduction

Since the closure of the Sitka Pulp Mill in 1993 and the Ketchikan Pulp Corporation in 1997, Alaska has been rebuilding its forest products industry. The McDowell report (1998) examined value-added forest products manufacturing in Alaska and found that much of the lumber used in Alaska was imported from the lower forty eight states. The report stated that there was the potential to substitute "Made in Alaska" forest products for some of the forest products imported from the lower forty eight states. However, Alaska only had an installed base of 94 thousand board feet of dry kiln capacity in 2000 (Nicholls and Kilborn 2001). This lack of capacity hindered Alaska's ability to supply softwood lumber to regional markets that required kiln dry lumber. In response to Alaska's lack of kiln drying facilities, a federal grant program was initiated and, by 2004, Alaska had increased it's kiln drying infrastructure to an estimated 220 thousand board feet (Nicholls et al. 2006). Brackley et al. estimated the sawmill processing capacity for timber from the Tongass National Forest in 2004, concluding that southeast Alaska sawmills were utilizing only 8.4% of total sawmill capacity in 2004. This excess sawmill capacity reflects both supply constraints imposed upon the federal forests as well as the changing demand for Alaska forest products.

In an effort to expand the market for Alaskan lumber, the Ketchikan Wood Technology Center conducted an in-grade strength testing program to evaluate the structural values unique to Alaskan softwood timber species. The in-grade testing program has resulted in the designation of three Western Wood Products Association (WWPA) registered grade marks for Alaskan species: Alaskan Hemlock, Alaskan Yellow Cedar, and Alaskan Sitka Spruce (WWPA 2005). These Alaska specific grade stamps provide an opportunity to differentiate Alaskan softwood species by their strength properties relative to similar species grown in other regions of North America.

The United States in now facing a housing slump that has depressed lumber prices. In 2007, housing starts were down approximately 38% from 2006 and lumber prices were at a five year low (Burgdorfer 2008). One way to shield a business from domestic economic down turns is to pursue global markets. Alaska's increased kiln dry capacity, combined with the unique structural strength of Alaskan softwood species, could provide new market opportunities in Japan.

The purpose of this research was to identify the mix of species currently being used for lamina in the production of glue laminated posts and beams in Japan and the potential for Alaska species to supply Japan's lamstock market.

2. An Overview of the Residential Construction Market in Japan

2.1 A Summary Of Housing Starts In Japan

Demand for wood products in Japan is primarily driven by the residential construction industry. In 2007, Japanese housing starts were 1.06 million units (Figure 2.1). Housing starts spiked in 1996 at 1.64 million units due to a rush to purchase homes before an increase in the consumer consumption tax. Then in 1997 housing starts declined as the Asian Currency Crisis affected Japan and other Asian economies. As Japanese GDP growth began to recover in 2000 and the recovery continued into 2006, housing starts began to recover.

Since 1990, the ratio of wooden housing starts has varied between 42% and 48% of total housing starts (Figure 2.1). The remainder of housing starts are of steel and concrete and reinforced concrete construction used primarily in apartment buildings and mansions. In 2007, wooden housing starts totaled 504,546 or 47.6% of total housing starts, an increase over the 2006 wooden ratio of 43.3%.

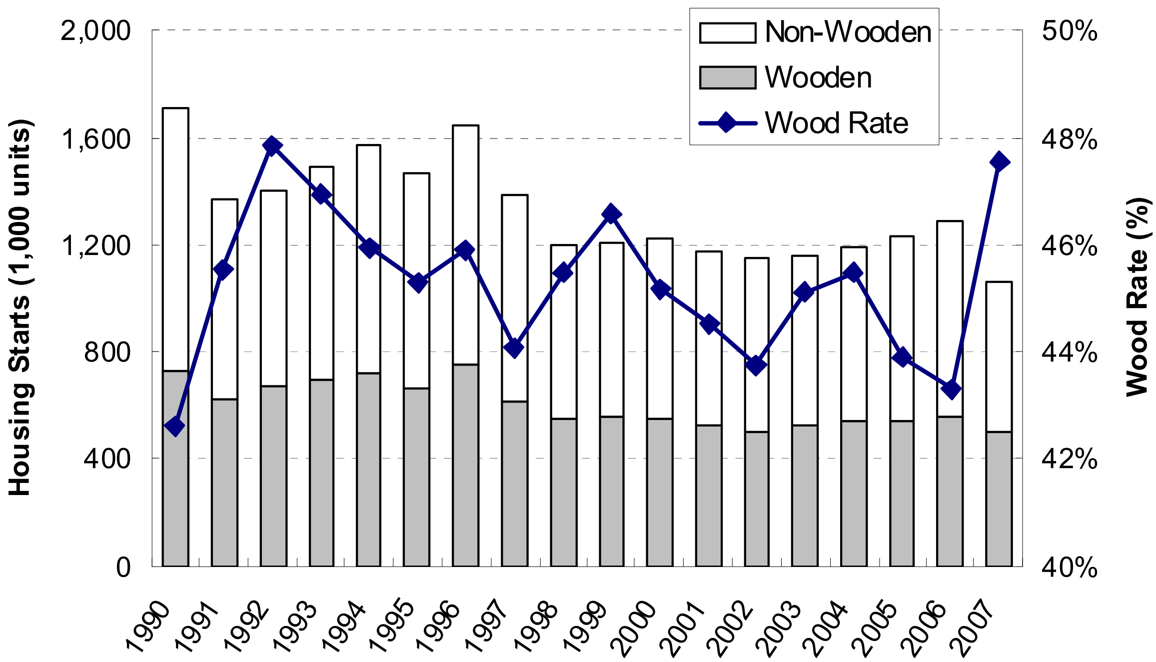

Figure 2.1: Housing Starts by Construction Type

Source: Ministry of Land, Infrastructure, Transport and Tourism

The three types of wooden housing in Japan are: traditional post and beam houses, 2x4 houses, and prefabricated houses (Figure 2.2). One trend that stands out in the housing data is the increasing market share for 2x4 housing. The 2x4 market share increase has come at the expense of traditional post and beam construction and prefab construction. While the 2x4 market share increased from 7% in 1990 to 18.8% in 2006, the post and beam market share declined from 88.2% to 77.4% and prefab market share declined from 4.8% to 3.8% over this same time. One trend favoring 2x4 housing is the desire of Japan's younger generation to live in western style homes.

Overall, housing starts in Japan were down substantially in 2007 due to a revision in the Building Standards Law (BSL) that was enacted in June 2007. The revision was enacted in response to a 2005 building construction scandal in which a rogue architect falsified the structural calculation documents required by the Japanese government. As a result, fourteen buildings (primarily condominiums) in the

Tokyo area were declared unable to withstand a moderate earthquake. Many of these condominium units had been purchased and the condominium owners had to vacate their newly purchased condominium or continue living in an unsafe building. Furthermore, many of the construction companies involved declared bankruptcy as a result of the scandal and the resultant lawsuits, leaving the building and condominium owners with little recourse to recoup their investment. In an effort to avoid similar problems in the future, the revised BSL requires certification of the structural integrity of new residential construction buildings by a qualified architect. Once the architecture plans have been certified, the building owner must submit the drawings and structural calculations to government officials. These documents are then reviewed and interim and final building site inspections are required before the final habitation documents are issued.

The current BSL revision applies primarily to multi-family condos and apartment buildings that are over 20 meters in height and all residential buildings over 13 meters in height built using reinforced concrete or steel reinforced concrete, or 9 meters in height at the eves. The BSL will be further revised in December 2008 to include all one and two story residential buildings regardless of the type of the type of structural materials used.

The immediate result of the revision to the BSL has been a bottleneck in the permitting process arising from a shortage of government staff to process these building certification applications and a shortage of qualified architects to calculate the structural strength of the condominiums. Most large builders have qualified architects on staff who can calculate the structural values required by the new procedure. However, it is harder for small contractors to find architects to calculate structural values for proposed new condominiums. This has been a major cause of the decline in housing starts in 2007. Also, many builders deferred projects because of uncertainty regarding the procedure for complying with the new standards.

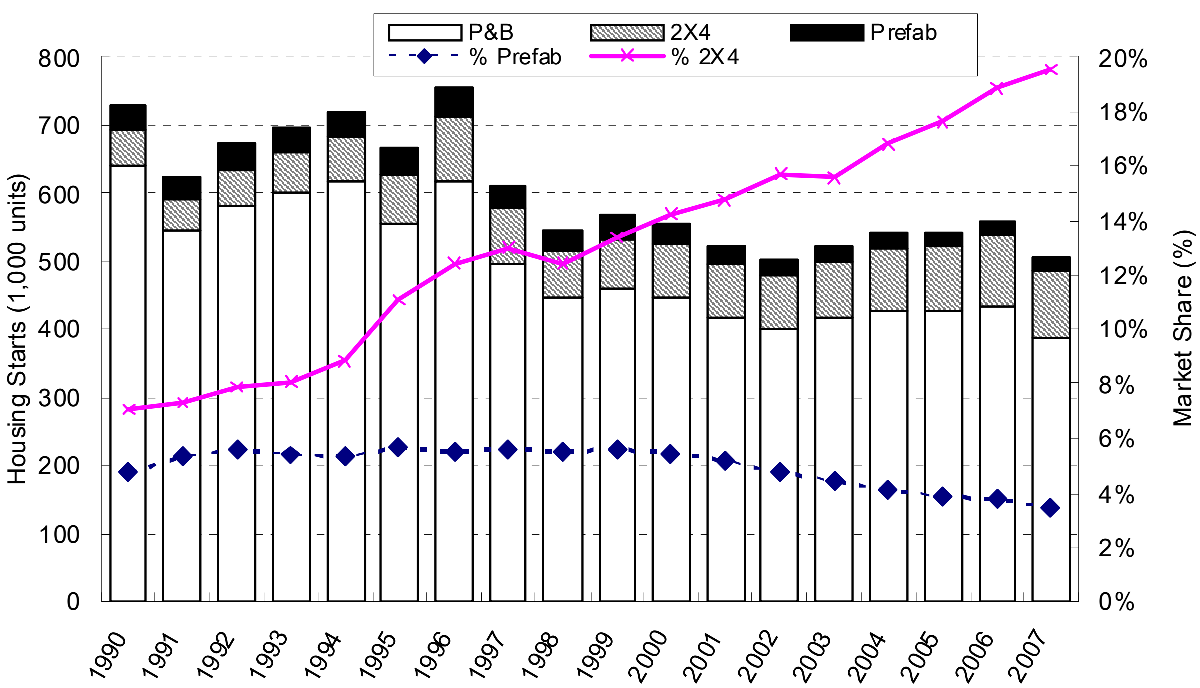

Figure 2.2: Wooden Housing Starts by Construction Type

Source: Ministry of Land, Infrastructure, Transport and Tourism

2.2 Japanese Residential Construction Methods

As stated above, the three main construction methods for wooden houses in Japan are post and beam, 2x4, and prefabricated. Of these methods, the post and beam construction is the most popular making up approximately 77.4% of Japan's single family residential construction starts. In order to understand Japan's glulam beam market, it is important to understand Japan's post and beam construction method. The major components of a Japanese post and beam house are illustrated in figure 2.3 and defined by Eastin and Larsen (2007) as follows:

Floor Structure

- Dodai – The ground sill laid on top of the foundation.
- Tsuka – Floor posts
- Obiki – Girders which are placed on top of floor posts, run the length of the house, and provide support for the floor joists.
- Neda – Floor joists which are placed atop and perpendicular to the girders.

Framing Structure

- Hashira – The main vertical structural wall posts of the house. These are composed of posts (kudabashira) and balloon posts (toshibashira). The balloon posts extend up two floors and are usually located in the corners and at the mid-span of the house. The kudabashira are located between the toshibashira and are used to frame each floor of the house.
- Mabashira – The non-structural studs placed between the structural posts.
- Sujikai – The diagonal cross bracing that is connected to the posts (hashira) and provides lateral support for the wall. The sujikai provides the lateral support for the wall system since wall sheathing is often not used with post and beam construction.
- Hirakaku – The beams placed atop the walls and across the width of the house to support the upper floors. Hirakaku are also used to frame the second floor of the house.

Roof Structure

- Hari – These are tie beams that are combined with hirakaku beams and placed across the width of the house.
- Keta – The top plate that is laid along the top of the second floor exterior walls. This is used as a point of attachment for the rafters (taruki).
- Taruki – The roof rafters
- Koyazuka – The roof posts that are on top of the beams and tie beams to provide vertical support for the roof components.
- Moya – The purlins that are placed atop the roof posts and run the length of the house.
- Munagi – The central purlins that form the ridge of the roof system.

There are various widths, lengths, and thicknesses for the members described above (Table 2.1). Figure 2.4 illustrates the locations of glulam beams used in a Japanese house where each is labeled with the numbers 1 to 6. The primary uses of glulam in a Japanese house are: hirakaku beams (1,4), kudabashira posts (2), tie beams (3) roof posts (5), and roof support beams (6).

Table 2.1: Approximate Volume and Specifications for Structural Lumber Used in 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

Source: CINTRAFOR

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

* Primary lumber length used.

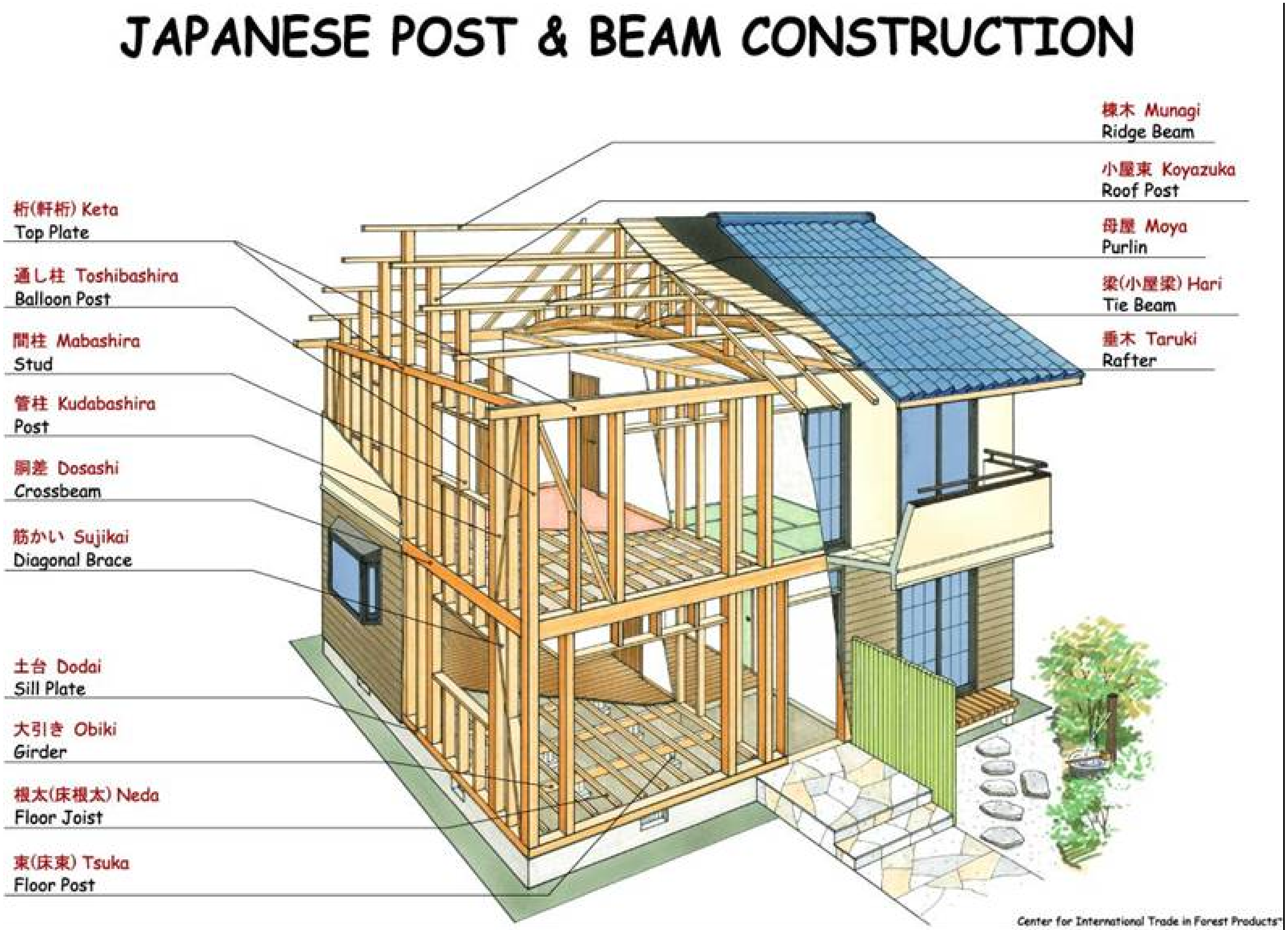

Figure 2.3: Japanese Post and Beam Construction

Source: CINTRAFOR

Figure 2.4: Glulam Beams Used for Japanese Residential Construction Framing (Source: Japan Laminated Lumber Association)
(1, 4) hirakaku beams, (2) kudabashira posts, (3) tie beams (5) roof posts, and (6) roof support beams

3. Glulam Beam Market

The Japanese glulam beam market has been growing steadily since the early 1990's. From 1993 to 2007 total glulam beam usage climbed from 199,300 cubic meters to 1,814,100 cubic meters (Table 3.1). The Japanese glulam beam supply comes from both domestic production and imports. In 2007, domestic production accounted for 65% of Japan's glulam beam usage with the remaining 35% coming from imports.

Table 3.1: Japanese Glulam Production and Imports (unit: 1,000 cubic meters)

Year	Domestic Glulam Production (excluding overlaid posts)	Glulam Imports (tariff code 4418.90-222 only)	Total Japanese Glulam Production and Imports
1993	140.1	59.2	199.3
1994	174.1	89.4	263.5
1995	208.1	147.5	355.6
1996	340.1	319.1	659.2
1997	385.0	289.4	674.4
1998	374.2	149.0	523.2
1999	483.7	271.3	755.0
2000	622.3	444.6	1,066.9
2001	781.6	498.3	1,279.9
2002	945.7	516.1	1,461.8
2003	1,190.7	540.5	1,731.2
2004	1,276.1	610.8	1,886.9
2005	1,309.7	670.8	1,980.5
2006	1,489.6	805.6	2,295.2
2007	1,172.1	642.3	1,814.1

Source: Japan Laminated Lumber Association and Japan Customs Bureau

Note: Japanese production includes non-overlaid, small dimension structural glulam posts but excludes overlaid posts.

3.1 Domestic Glulam Production

Japanese glulam beams are classified into three categories: large dimension, medium dimension, and small dimension beams. Each category is defined by the dimension of the glulam beam (Table 3.2). Small dimension glulam beams are further divided into the small dimension overlay and small dimension non-overlay categories. The difference between these two categories is whether the beam has an overlaid veneer wrap or not. In examining these three categories, medium and small dimension glulam beams together comprise 98% of the total with the remainder being large dimension.

Table 3.2: Japan's Domestic Structural Glulam Definitions

Category	Description	Use
Large Dimension	The cross sectional area is 300 square centimeters and above. The thickness is 15 centimeters and above.	Large beams normally used in commercial construction
Medium Dimension	The thickness is 7.5 centimeters and above. The width is 15 centimeters and above.	Post and beams
Small Dimension	The thickness is below 7.5 centimeters or the width is below 15 centimeters.	Smaller structural components
Overlay	Veneer wrapped member	Structural and non-structural decorative posts

Source: Japan Laminated Lumber Association

From 1993 to 2007, medium dimension glulam beam production increased 28 times and small non-overlay glulam beam production grew 50 times. In contrast, large dimension glulam beams declined slightly (Table 3.3). A majority of the structural glulam is medium dimension used for post and beams.

Table 3.3: Japan's Domestic Structural Glulam Production Volumes by Dimension (unit: 1,000 cubic meters)

	Structural Glulam				
	Large Dimension	**Medium Dimension**	**Small Dimension (non-overlay)**	**Small Dimension (overlay)**	**Total**
1993	20.4	21.9	10.3	87.5	**140.1**
1994	22.8	29.0	19.9	102.4	**174.1**
1995	29.7	37.4	43.7	97.3	**208.1**
1996	35.3	61.1	141.6	102.1	**340.1**
1997	29.3	65.5	194.6	95.6	**385.0**
1998	33.9	93.4	179.3	67.6	**374.2**
1999	35.0	120.9	246.9	80.9	**483.7**
2000	36.2	189.2	326.2	70.7	**622.3**
2001	39.5	292.7	391.4	58.0	**781.6**
2002	46.1	407.7	444.2	47.7	**945.7**
2003	54.1	525.9	573.5	37.2	**1,190.7**
2004	51.5	581.6	606.8	36.2	**1,276.1**
2005	40.7	594.4	646.2	28.4	**1,309.7**
2006	30.1	790.6	646.2	22.7	**1,489.6**
2007	19.3	619.0	519.4	14.4	**1,172.1**

Source: Japan Laminated Lumber Association

3.2 Japanese Glulam Imports

In 2007, total Japanese glulam imports were 642,300 cubic meters, which was 35% of the total glulam supply. The top three countries, that exported glulam beams to Japan, accounted for approximately 76% of all glulam imports in 2007. The major suppliers of glulam beams to Japan were Austria (30%), Finland (30%), and China (15%). From 1998 to 2007 Austrian glulam exports grew by approximately 11 times, Finland by approximately 16 times, and China by approximately 28 times (Tables 3.4 and 3.5). As these three countries have been increasing their glulam exports to Japan, glulam exports from the United States and Canada have been declining. While some of the North American decline can be attributed to a strong US Dollar between 2000-2005 and lower labor costs in China, much of this decline is the direct result of failing to meet the needs of Japanese precut manufacturers who produce post and beam components. European and Chinese suppliers have targeted the Japanese market, established strong relationships, and supply a glulam beam that meets the specifications Japanese precut manufacturers require. The recent weakening of the US Dollar presents an opportunity for US manufacturers to reenter the Japanese market. However, it is essential to establish long-term relationships with Japanese buyers and manufacturers and to provide them with the product quality that they require.

Table 3.4: Japanese Glulam Imports from European Countries (unit: cubic meters).

	Norway	Sweden	Denmark	Netherlands	Germany	Finland	Austria	Estonia
1998	499	19,640	138	3,273	10,062	12,787	17,927	47
1999	317	39,473	1,421	1,133	31,020	33,151	50,043	-
2000	6,218	64,692	12,435	3,778	66,822	65,125	86,305	348
2001	6,112	72,056	14,676	1,672	93,734	83,374	84,082	100
2002	3,469	80,852	8,787	1,092	67,704	111,368	128,719	96
2003	2,540	71,384	3,682	1,956	66,733	120,835	141,857	317
2004	110	70,868	107	398	55,861	135,134	155,609	-
2005	-	63,207	-	55	21,460	137,969	225,670	5,356
2006	-	60,139	-	-	12,910	194,541	246,470	48,454
2007	44	45,101	-	-	4,550	193,730	195,545	37,579

Source: Japan Customs Bureau

Table 3.5: Japanese Glulam Imports from Non-European Countries (unit: cubic meters)

	China	Russia	Canada	USA	Chile	Brazil	Australia	NZ
1998	3,544	23,630	17,424	30,390	453	492	-	7,807
1999	6,944	26,280	24,535	42,392	146	226	1,321	11,417
2000	16,008	27,311	35,163	40,172	1,067	617	327	16,908
2001	24,600	26,213	40,476	30,305	716	550	100	18,958
2002	23,609	31,218	20,697	19,841	326	711	948	16,079
2003	64,162	24,945	23,639	10,385	249	2,619	847	2,906
2004	128,172	23,388	26,197	5,376	-	2,232	53	6,910
2005	152,039	28,940	17,826	2,776	-	1,958	887	10,356
2006	170,275	35,018	14,211	990	-	1,922	796	5,985
2007	98,233	29,161	11,167	1,599	-	3,141	95	5,018

Source: Japan Customs Bureau

Note: 2007 estimate based on 2006 December to 2007 November.

3.3 Lamstock

The term lamstock refers to the lumber that is glued together to manufacture a glulam beam. Japanese lamstock grades are defined by the Japanese Agriculture Standards (JAS) visual grading rules (Table 3.6). The grades range from Grade 1 to Grade 4 with Grade 1 being the highest quality. The lamstock grades are determined by a combination of knot ratios (size and location), slope of the grain, amount of surface checking, discoloration and the number of annual growth rings per inch. Decay is not permitted in any of the lamstock grades. The JAS grading rules also specify strength standards based on the modulus of elasticity in gigapascals (MOE in GPa) for the various timber species (Table 3.7). Each timber species is given a category designation from A to F with A having the highest MOE values and F having the lowest MOE values.

Table 3.6: Synopsis of Japanese Agricultural Standard (JAS) Visual Grading Lamstock Rules

	Grade 1	Grade 2	Grade 3	Grade 4
Group knot diameter ratio	Not to exceed 20%	Not to exceed 30%	Not to exceed 40%	Not to exceed 50%
Edge knot diameter ratio	Not to exceed 17%	Not to exceed 25%	Not to exceed 33%	Not to exceed 50%
Slope of grain	Not to exceed 1/16	Not to exceed 1/14	Not to exceed 1/12	Not to exceed 1/8
Decay	**None permitted**			
Checking	Extremely small checks permitted as long as they are inconspicuous	Same as left	Same as left	Width of checks must be extremely small and length must not exceed 50 mm.
Discoloration	Must be inconspicuous	Same as left	Same as left	Same as left
Average annual growth ring	Not to exceed 6 mm	Same as left	Not specified	Not specified

Source: Japanese Agricultural Standards (JAS) for Glue Laminated Timbers, 2007

Table 3.7: Summary of Japanese Agricultural Standard (JAS) Strength Values for Lamstock (Modulus of Elasticity in Gigapascals)

		Grade 1		Grade 2		Grade 3	
		Mean MOE Value	Minimum MOE Value	Mean MOE Value	Minimum MOE Value	Mean MOE Value	Minimum MOE Value
A	Apitong	16.0	13.0	14.0	11.5	12.5	10.5
B	Birch, Beech, White Oak, Southern Pine, Douglas-fir	14.0	11.5	12.5	10.5	11.0	9.5
C	Hinoki, Japanese Larch, Japanese Red Pine, Japanese Black Pine, Port Orford Cedar	12.5	10.5	11.0	9.5	10.0	8.5
D	Japanese Hemlock, Alaska Yellow Cedar, Radiata Pine, Western Hemlock	11.0	9.5	10.	8.5	9.0	7.5
E	Spruce, Lodgepole Pine, European and Russian Red Pine, Ponderosa Pine	10.0	8.5	9.0	7.5	8.0	6.5
F	Japanese Cedar, Western Red Cedar, White Cypress	9.0	7.5	8.0	6.5	7.0	6.0

Source: Japanese Agricultural Standards (JAS) for Glue Laminated Timbers, 2007
1 Gigapascals is 145,038 psi

Japanese domestic lamstock is produced as both rough and planed lumber that has a moisture content of 12% plus or minus 2%. The lamstock thickness varies depending on the final size of the beam but is normally between 20 mm and 38 mm. The lamstock width also varies depending on the final beam dimensions but is normally between 110 mm and 130 mm. Common lamstock lengths are between 3 and 6 meters. One popular European supplier offers spruce and pine lamstock rough lumber with dimensions of 34 mm x 112 or 127 mm for beams and 24 or 28 mm x 110 or 127 mm for posts. They also offer planed lamstock with dimensions of 22 mm x 106 mm for posts and 32 mm x 109 or 124 mm for beams. The lengths range from 2985 to 5985 mm.

Here is an example of how a finished glulam beam is manufactured. Five pieces of kiln dried lamstock (30.5 x 108 mm) are glued together to form a rough glulam beam that is 152.5 mm x 108 mm. This beam will then be planed on all sides to produce a glulam beam with a final dimension of 150 mm x 105 mm. Another example is four pieces of kiln dried lamstock (34 mm x 128 mm) being glued together to produce a finished beam with the final dimensions of 120 mm x 120 mm.

The glulam beam manufacturing process consists of the following basic steps:

1. Grading of the lamstock
2. Finger jointing the lamstock into longer lengths
3. Face gluing the lamia together to form a rough glulam beam
4. Rough beam is hot pressed to cure the resin
5. Planing and fabrication to the final beam dimensions

4. Japanese Glulam Beam Companies

The researchers travelled to Japan in November 2006 and visited six Japanese glulam manufacturers: Meiken Lamwood Corporation, Torisumi Laminators Corporation, Innosho Corporation, Saito Wood Industries, Emachu Corporation, and Nice Corporation. These companies represent approximately sixty percent of Japan's total glulam beam production (Barnes 2008). The meetings were arranged by staff from the Tokyo office of the Softwood Export Council. Ms. Tomoko Igarashi, the Softwood Export Council representative, travelled with the researchers and provided translation assistance. The company representatives were asked what species they are currently using for lamstock, technical specifications that influence material specification, market conditions, and what species they intended to use in the future. The results are summarized below.

4.1 Meiken Lamwood Corporation

Meiken was originally founded in 1923 and, as of 2006, had approximately 240 employees. They are located in Okayama, Japan and manufacture glulam beams for residential and commercial construction. Meiken is a growing company and recently announced plans to build a new plant in Kochi Prefecture (Japan Lumber Journal 2007). This plant will utilize locally produced cedar lumber for stud and lamstock production.

Meiken utilizes the following species to manufacture glulam beams; Douglas-fir, European whitewood, sugi, and Russian red pine. The European whitewood is used primarily for 105 mm square posts (hashira) (Figure 4.1). The Douglas-fir is used for glulam beams (hirakaku) produced in various widths ranging from 120 mm to 220 mm. The Russian red pine is used for glulam beams (hirakaku) with widths ranging from 105 mm to 180 mm. Standard beam depths range from 120 mm to 210 mm and Meiken can produce glulam beams in lengths up to 20 meters. Meiken uses lamstock lumber that is 25 mm thick to produce glulam beams that are 105 mm thick. They use 30 mm lamstock to produce beams that are 120 mm and 150 mm thick. They purchase lamstock rough and dried to 12% moisture content plus or minus 2%.

Figure 4.1: Meiken European Whitewood 5 Ply Beam

Although European whitewood is perceived as being weaker and less decay resistant than redwoods and non-durable species, it is extremely popular in Japan for four reasons: low price, minimal warping and twisting, light color, and stable supply (Nakashima 2006). However, a combination of the strong Euro and increasing demand from China, Europe, and the Middle East is constraining the European whitewood supply. Meiken's product manager explained that the trend in the Japanese market is to replace European wood with domestic species including sugi (Japanese cedar). However, there are still problems with sugi that the industry is trying to overcome. One of the major problems is a substantial amount of degrade caused by warping and twisting when sugi is kiln dried. Another problem is that the characteristics of the wood vary greatly across the different regions of Japan. For example, the Kyushu region produces sugi that grows fast and posesses wide growth rings, which makes Kyushu sugi structurally weaker than sugi from other regions. Sugi from the northern regions grows slower producing tighter rings but these trees are bent by the annual winter snow load, which causes growth stresses in the trees and leads to warping and twisting in the lumber during kiln drying. In spite of these problems, Meiken is utilizing more sugi and other domestic species due to the constrained supply of European whitewood and Russian red pine. In addition to sugi, it was recently reported that Meiken has adopted North American lodgepole pine to supplement their lamstock for laminated posts (Japan Lumber Reports 2007)

A major problem glulam manufacturers are facing is that they have little or no pricing power with their primary customers, pre-cut manufacturers and home builders. Meiken's company representative explained that they recently tried to increase prices to offset their rising raw materials costs. However, builders and pre-cutters balked because they have no room to pass increased glulam beam costs on to their customers. Consumers prefer to spend their money on a fancy kitchen and a luxurious bathroom, not a "strong house". Therefore, glulam mills are often forced to absorb increased raw material costs and this is a major reason why some glulam manufacturers are beginning to utilize cheaper domestic lamstock.

4.2 Torisumi Laminators Corporation

Torisumi, established in 1965, has 170 employees. Torisumi is both a pre-cut lumber mill and glulam manufacturer. They are located in Nara prefecture in western Japan. They purchase two main sizes of lamstock. First, they use 27mm x 130mm lamstock to manufacture 120 mm x 120 mm glulam beams. Second, they use 38 mm x 130 mm lamstock to manufacture 120 mm x 150 mm beams. The lamstock is purchased rough and dry.

This company stated that their three most important criteria for lamstock are low cost, steady supply, and high quality. They currently use North American SPF (spruce, pine, fir mix), Douglas-fir, Alaska yellow cedar and sugi (Moriwaki 2006). The Alaska yellow cedar glulam is used to produce ground sills, referred to as dodai (Figure 4.2). The pictured glulam dodai was manufactured from Alaska yellow cedar lamstock measuring 37mm x 113mm x 3048mm long.

Torisumi has also been increasing their use of domestic sugi. The mill representative mentioned that many sugi lumber products rely on subsidies from the government and that in the absence of subsidies, using sugi in glulam beam production would not be cost effective. It is interesting to note that, although Douglas-fir lamstock is stronger, Torisumi considers Russian red pine and Douglas-fir to have similar strength characteristics (Table 3.7). The representative mentioned that although Douglas-fir and Russian red pine can both be used for glulam production, Russian red pine has historically been much cheaper. However, on January 1, 2007 Russia imposed a 20% export duty on logs (this is scheduled to increase to 80% by February 2009), which will significantly increase the cost of Russian red pine products.

Figure 4.2: Alaska Yellow Cedar Laminated Ground Sill (Dodai)

As with Meiken, the Torisumi representative pointed out the tremendous pricing pressure his company feels from homebuilders and pre-cut manufacturers. One of their strategies to avoid direct price competition is to offer excellent service to their customers. For example, they allow their customers to personally inspect the glulam beams at the factory. If there are any problems or defects noted during the inspection, they are handled right away so that the customer is assured that a quality product will arrive at the job site. Furthermore, homebuilders can come to the factory to perform custom work on their beams using factory machinery and tools. Torisumi strives to reduce their customer's job site labor costs by doing product finishing in the factory that usually is done by carpenters on the job site. Another strategy that Torisumi employs is to avoid manufacturing products where price competition is high. For example, Torisumi concentrates on 120 mm x 120 mm glulam products because their representative noted that competition was too high in the 105 mm x 105 mm post market. Finally, Torisumi owns their own trucking company, which allows them to transport materials to their customer's job site on a just-in-time basis. In summary, Torisumi's philosophy is to avoid direct price competition by working with their customers to increase product quality and service and reduce job site labor costs.

The company representative stated that most of the structural glulam beams are made in Japan while most of the non-structural studs (mabashira) are imported from Europe. One key issue facing Japan's forest products industry is determining where the non-structural posts will come from as the European whitewood supply of posts diminishes in response to the strong Euro?

4.3 Innosho Corporation

Innosho Corporation, established in 1955, has 290 employees. They manufacture glulam beams and posts primarily from European whitewood, Russian red pine, Douglas-fir, and sugi. Innosho's Chairman has stated that using resources in an environmentally sustainable way is key to the company's strategy. As part of this strategy, Innosho received Programme for the Endorsement of Forest Certification Schemes (PEFC) chain of custody certification (Figure 4.3).

Figure 4.3: Innosho Glulam Beams with the PEFC Certification Label

The PEFC was founded in 1999 and is a framework for demonstrating that wood products originate from certified forests that are managed in conformance to the principles of social, environmental, and economic sustainability (Finnish Forest Certification System 2007). Growth is also part of Innosho's strategy. The company recently announced expansion plans and has opened a new mill located in Okayama prefecture (Japan Lumber Reports 2007). It also plans to develop a wood research center to study drying techniques for sugi and other domestic species.

As with the other companies, Innosho is facing increasing costs for their imported lumber (Nakatani 2006). As European whitewood becomes more expensive, they are increasingly substituting domestic sugi. As Russian red pine becomes more expensive, they are substituting Douglas-fir. However, at the time of this interview in November 2006, Innosho explained that Douglas-fir was still more expensive than Russian red pine, despite the 20% export tariff that is levied on the Russian red pine.

Regarding US forest products, the Innosho representative explained that, although there are opportunities for US companies to reenter the Japanese market, he feels US companies do not understand the Japanese market as well as European companies. He pointed out that European companies continuously study the Japanese market and listen to their customers. In order for US companies to succeed in Japan, they must work closely with their Japanese customers and provide the product specifications required by their Japanese customers.

4.4 Saito Wood Industries

Saito Wood Industries was established in 1957. Saito is unique amongst the companies interviewed in that they specialize in manufacturing large structural glulam beams used in commercial and industrial applications. The company is concerned about global warming and their marketing information emphasizes the value of forests and forest products that function as a carbon sink. The president also stated his concern about logs sourced from illegal logging operations. However, as of 2006, Saito Wood Industries did not have a program to utilize lamstock originating from sustainably managed forests.

One of their most accomplished projects was manufacturing the structural glulam beams that were used to build the Yamabiko Sports Dome in Nagano prefecture (Figure 4.4). Saito Wood Industries requires lamstock that is strong and durable and they prefer to use Douglas-fir and karamatsu (Japanese larch) for their structural beams. The president stated that Japanese sugi does not have the strength properties his company needs (Saito 2006). However, his major concern with Douglas-fir is that the price is not stable. Douglas-fir prices are constantly rising and falling and this makes it hard to plan out his raw material costs. Even though there is some dissatisfaction with the unstable price, the president stated that demand for his products is increasing and the domestic supply of timber cannot keep up with demand, suggesting the potential to increase Douglas-fir lamstock exports from North America.

The president is optimistic about future demand for glulam beams in Japan. One major problem facing the glulam beam industry is the Building Standards Law which limits glulam beam applications for commercial buildings. He is hopeful that this law will be revised to allow more glulam beams to be utilized in commercial buildings. Another issue facing the industry is glulam beam imports from China. However, he is confident that his company will be able to compete on the basis of quality against the cheaper Chinese imports.

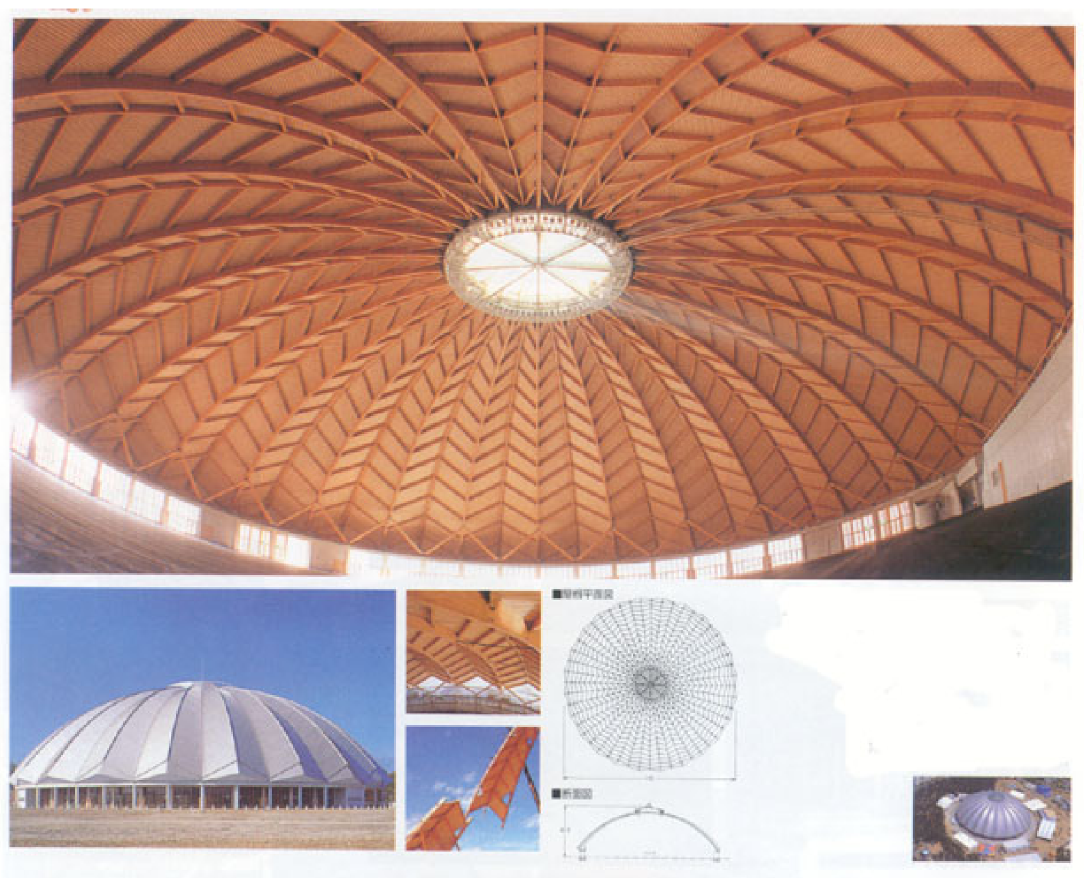

Figure 4.4: Yamabiko Sports Dome Built Using Saito Wood Industries Glulam Beams

4.5 Emachu Corporation

Emachu Corporation, founded in 1923, has 380 employees. Emachu manufactures both glue laminated square posts and structural glulam beams. The species they use are Douglas-fir, Russian red pine, European whitewood and Japanese larch. Emachu uses two widths of lamstock, 112 mm to 115 mm that they purchase kiln dried and planed on all sides (S4S) as well as 127 mm to 130 mm that they purchase as rough (unplaned) lumber. The thickness of the lamstock varies depending on the end use.

For laminated posts, Emachu uses European whitewood from Finland and Sweden. As European whitewood prices have increased, the company has begun to purchase more Canadian SPF and domestic Japanese sugi (Takahashi 2006). In certain regions within Japan there are government incentives to support the increased use of domestic timber. While sugi does not have the strength of Douglas-fir and Russian red pine, this can be partly mitigated by modifying the house design. For example, builders who use sugi posts and beams might build a single story house to avoid the structural load of a second floor.

As with the other glulam beam manufacturers, Emachu is finding it increasingly hard to obtain Russian red pine lamstock. In response to this supply shortage, they have expressed an interest in purchasing more Douglas-fir, but they report that they are having a hard time identifying a stable supply. The company representative pointed out that, even with US species, they prefer to purchase metric dimensions because the product recovery from 2x4 dimension lumber is poor. One of the problems with increasing their supply of Douglas-fir lumber from the US is that US companies have reduced their presence in Japan substantially. Currently, Emachu knew of 3 companies with a presence in Japan; suggesting that there are very real opportunities for US suppliers willing to maintain a presence there to sell their products.

4.6 Nice Corporation

Nice Corporation is a building materials distributor. They do not manufacture glulam beams but distribute them. As with the glulam beam manufacturers interviewed, the Nice representative stated that it is getting harder and harder to procure Russian red pine and European whitewood lamstock (Toroki 2006). He attributed this difficulty to the Russian log export tariff, the strong Euro, and increasing demand for wood products in the Middle-East, Europe and China. As the supply of European and Russian lamstock continues to tighten, he expects that glulam beam manufacturers will utilize more Douglas-fir, hemlock, and SPF from North America as well as increasing their use of domestic species like sugi (Japanese cedar), and hinoki (Japanese cypress).

5. Conclusions and Recommendations

The glulam beam manufacturers examined in this study, and arguably the rest of the glulam beam industry in Japan, are seeking to diversify their lamstock supply in the face of supply constraints that have occurred in the traditional supply regions. Russia has placed an export tax on log exports while the Euro and the Canadian dollar have strengthened significantly relative to the US Dollar. All of these developments have effectively increased the price of lamstock from these supply regions and increased the competitiveness of US lamstock products. In addition, despite the existence of substantial subsidies to increase the use of domestic timber species like sugi, demand for these species remains low because of the difficulty in kiln drying sugi without experiencing substantial amounts of product downfall from warping and twisting. While these resources will undoubtedly continue to play a role in Japan's lamstock market, there are many opportunities for new suppliers to develop a presence in the Japanese market. One recent example that illustrates the potential in Japan relates to the fact that MacMillan Bloedel Japan has started marketing a four-ply glulam beam made from Canadian hemlock (Japan Lumber Reports 2007). Given that the Canadian hemlock resource is similar to Alaska's hemlock, this demonstrates that kiln dried lamstock lumber from Alaska has the potential to be successfully marketed in the Japanese market. To help Alaska (and other US) sawmills better assess their market opportunities in Japan, the following strategic recommendations are proposed:

1. Organize Workshops to Teach Alaska Sawmills About the Technical Product Requirements of the Japanese Lamstock and Glued Laminated Beam Market

Topics should include Japanese Agricultural Standards (JAS) product specifications, the range of lamstock dimensions used in the Japanese market and the post and beam residential construction method. The workshop would also provide the basics of exporting and finance including a detailed presentation of the different types of export channels used in Japan including direct exports, export consolidators and trading companies. This type of information would make it easier for a company interested in exporting lamstock products to determine which type of export strategy would be most appropriate for their company.

2. Pre-Qualify Sawmills in Alaska That Have the Capability to Produce Kiln Dried Lamstock for the Japanese Market

Alaska sawmills should be contacted to identify sawmills that have the production capacity, technical capability, marketing staff and long-term commitment to export to Japan.

3. Organize a Trade Mission to Japan to Visit Glulam Manufacturers in Japan

A trade mission could be organized to introduce representatives of pre-qualified sawmills to glulam beam manufacturers in Japan. Cooperators could include the State of Alaska Department of Trade, the University of Alaska, the USDA Forest Service Wood Utilization Center, and the Softwood Export Council. Both the Softwood Export Council and Alaska Department of Trade have Japanese staff in Tokyo who could assist with the trade mission. The primary goal of the trade mission would be for Alaska sawmills to identify potential customers within the Japanese glulam beam manufacturing industry.

4. Display Alaska Lamstock Samples and Literature at the Japan Home Show

This should be a coordinated effort between Alaska sawmills, the University of Alaska, the Softwood Export Council, and the State of Alaska Department of Trade Japan Office. The Softwood Export Council sponsors a booth at the Japan Home Show which is held every November in Tokyo. The SEC booth is provided to promote US softwood products and building materials to Japanese precutters and home builders. Alaska sawmills could provide lamstock samples of Alaska Yellow Cedar, Alaska Sitka Spruce, and Alaska Hemlock to display at the SEC booth at the Japan Home Show. Product literature that has been translated into Japanese should be provided to describe Alaska forest products. It would also be useful for a representative from Alaska to be in attendance at the SEC booth to help answer questions and facilitate further information and contacts for potential Japanese customers.

5. Invite Potential Japanese Customers to Visit Sawmills in Alaska

It is very important to build relationships with major Japanese buyers. Relationships are the key to Japanese business and providing opportunities for Alaska producers and Japanese buyers to meet face to face is very important. Japanese also value “kengaku”, which is roughly translated as site visits. This would allow potential Japanese buyers to see how the product is manufactured and to offer suggestions for how to manufacture products that better meet their specific requirements. As noted above, this should be a coordinated effort between Alaska sawmills, the University of Alaska, the Softwood Export Council and the State of Alaska Department of Trade.

6. Create Alaska Lamstock Brands Based on the Established WWPA Registered Trademarks

There has been a lot of excellent work done by the Ketchikan Wood Technology Center and other Alaska forest products organizations to establish the three WWPA registered grade marks for Alaska species: Alaska Hemlock, Alaska Yellow Cedar, and Alaska Sitka Spruce. These labels could be utilized to establish brands for Japanese lamstock. For example, lamstock brand names could be established as “Alaska Hem Lam”, “Alaska Yellow Cedar Lam”, and “Alaska Sitka Spruce Lam”. These brands could then be utilized to differentiate Alaska lamstock from similar timber species grown in competing regions.

7. Export Lamstock Blanks

In addition to kiln dried planed lamstock lumber, rough sawn kiln dried lamstock blanks could also be considered for export to Japan. This would allow Alaska mills to export lumber that could be re-sawn to exact specifications by laminating companies in Japan.

The results of this research clearly demonstrate the potential for Alaska sawmills to export lamstock lumber, both rough and planed, to Japan. Supply constraints in both Russia and Europe mean that Alaska sawmills have a window of opportunity to develop export markets for lamstock into Japan. However, sawmills in Alaska will need to learn more about the Japanese market in order to better assess the market opportunity in Japan and their own ability to compete in the Japanese market. This research provides a set of strategic recommendations that will allow Alaska sawmill managers to acquire the market information necessary to make an informed export decision.

6. Literature Cited

Barnes C. 2008. Personal communication with Charles Barnes of APA - the Engineered Wood Association. Tacoma, WA. 2/7.

Brackley A. M., D. J. Parrent and T. D. Rojas. 2006. Estimating sawmill processing capacity for Tongass timber: 2003 and 2004 Update. Research Note PNW-RN-553. Portland, OR: U.S. Department of Agriculture, USDA Forest Service, Pacific Northwest Research Station. 6p.

Burgdorfer B. 2008. Lumber Prices Hit a 5-Year Low, Cutbacks Seen. Reuters News Service. January10.

Eastin, I.L. and C. Larsen. 2007. The market for softwood lumber in Japan: Opportunities for Douglas-fir structural lumber for hirakaku, CINTRAFOR Working Paper No. 106. University of Washington, Seattle, WA. p 21.

Eastin, I.L. J. Roos and P. Tsournos. 2003. Niche market opportunities for Alaskan forest products in Japan, CINTRAFOR Working Paper No. 91. University of Washington, Seattle, WA. p 39.

Japan Lumber Reports. 2007. Meiken Lamwood to build plant in Kochi. Tokyo, Japan. 12/22. 7p.

Japan Lumber Reports. 2007. Innosho Woods to build new mill. Tokyo, Japan. 7/13. 7p.

Japan Lumber Reports. 2007. Meiken Lamwood uses lodgepole pine. Tokyo, Japan. 9/28. 7 p.

Japan Lumber Reports. 2007. M&B markets hemlock laminated posts. Tokyo, Japan. 9/28. 7 p.

Finnish Forest Certification System Web Site. 2007. http://www.ffcs-finland.org/

Nakashima T. 2006. Interview at Meiken Lamwood Corp. Okayama, Japan 11/9/2006.

Nakatani K. 2006. Interview at Innosho Forestry. Shizuoka, Japan 11/11/2006.

McDowell Group. 1998. The Alaska market for value-added lumber products. Juneau, AK: McDowell Group; final report. Prepared for the Forest Products Manufacturing Project. 70 p.

Morikawa H. 2006. Interview at Torisumi Laminators Corporation. Nara, Japan. 11/10/2006.

Nicholls, D.L., A. Brackley, T. Rojas. 2006. Alaska's lumber drying industry – impacts from a federal grant program. General Technical Report, PNW-GTR-683. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 12 pp.

Nicholls, D.L. and K. Kilborn. 2001. An assessment of Alaska's lumber drying industry and current potential for value-added processing. General Technical Report, PNW-GTR-522. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 20 p.

Saito T. 2006. Interview at Saito Wood Industries. Nagano, Japan 11/13/2006.

Sasatani, D., J. Roos, A. Brackley and I. Eastin. 2005. Niche market opportunities for Alaska forest products in Japan (2005 Update). CINTRAFOR Working Paper 100. University of Washington, Seattle, WA. 37 p.

Takahashi K. 2006. Interview at Emachu Corporation. Tochigi, Japan 11/14/2006.

Toroki K. 2006. Interview at Tokyo Home Show. Tokyo, Japan 11/16/2006.

WWPA. 2005. Design values and spans for Alaskan species lumber. Portland, OR: Western Wood Products Association. Technical Note TN05-01/Rev2-05.