C I N T R A F O R

Working Paper

106

The Market for Softwood Lumber in Japan: Opportunities for Douglas-fir Structural Lumber for Hirakaku

Ivan L. Eastin

Craig Larsen

June 2007

CINTRAFOR
Center for International Trade in Forest Products

CINTRAFOR

Working Paper 106

The Market for Softwood Lumber in Japan:

Opportunities for Douglas-fir Structural Lumber for Hirakaku

Ivan Eastin
Craig Larsen

June 2007

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

Technical Editor: Angel Ratliff

Executive Summary

For fifteen years between 1989 and 2004, US exports of softwood lumber were mired in decline. During this period, the volume of US softwood lumber exports plunged from approximately 8 million m^3 to less than 2 million m^3. This trend was a reflection of the relatively strong dollar which undermined the competitiveness of US softwood lumber, coupled with regulatory changes in major export markets (particularly Japan) and a strong housing market in the US. This combination of adverse factors influenced many US softwood lumber manufacturers to abandon their traditional export markets. This was especially evident in Japan where US exports of softwood lumber dropped from 3.5 million m^3 in 1989 to just 115,000 m^3 by 2005.

Recent years have seen a rapid reversal in some of the macroeconomic factors affecting the US softwood lumber industry. The US dollar has weakened considerably against both the Canadian dollar and the euro, greatly increasing the competitiveness of US wood products in export markets. Since 2002 the US dollar has weakened by 33.7% against the Canadian dollar (and is now almost at par with the Canadian currency) and by 34.1% against the euro. This alone has substantially increased the competitiveness of US softwood lumber in most markets.

At the same time, demand for softwood lumber in the US has fallen substantially as a result of the weak housing market. Since 2005, housing starts in the US have declined by 12.8% from 2.06 million starts in 2005 to 1.8 million starts in 2006. Housing starts are projected to drop further in 2007 to between 1.5-1.6 million. In response to the weak housing market, demand for softwood lumber in the US dropped by 6.4%, from 64.3 bbf in 2005 to 60.1 bbf in 2006. More worrying is the fact that US softwood lumber demand is projected to drop to 54.2 bbf in 2007 before recovering only slightly in 2008 to 56.7 bbf.

With prices low and demand weak in the US market, many softwood lumber manufacturers have begun looking offshore again. Between 2004 and 2006, the volume of US softwood lumber exports grew by 18.6% to reach 2.2 million m^3. More importantly, the value of softwood lumber exports has jumped by 35.5% to reach $592 million. Softwood lumber exports have remained strong during the first four months of 2007, with exports increasing by 14.5% in terms of volume and 25.7% in terms of value. Encouragingly, the strong export performance of softwood lumber has not been confined to a small group of traditional softwood lumber export markets but has occurred across a broad range of markets. In the UK, softwood lumber exports are up by 675% in the four months of 2007, propelling the UK from the 14th largest market to the third largest market for US softwood lumber.

Douglas-fir (DF) lumber used for beam applications (*hirakaku*) continues to enjoy success in Japan. This success can largely be attributed to the superior performance (with respect to strength, straightness, dimensional stability, and visual appearance) of DF relative to other timber species. Thus, DF maintains a reputation as the premier timber species for *hirakaku* applications. Yet despite its strong reputation, DF has seen its market share slowly eroded by alternative lumber products such as European whitewood and European redwood glulam lumber. The primary basis for this trend has been the shift towards pre-cut housing components as well as the price sensitivity of Japanese home builders and pre-cutting manufacturers.

The objective of this research was to evaluate the use and specification of structural lumber within the Japanese post and beam construction market, particularly with respect to Douglas-fir lumber in beam applications. In addition, this project follows up on the recommendation of an earlier marketing report recommending that US Douglas-fir manufacturers consider the feasibility of developing and introducing branded DF hirakaku lumber in Japan. In order to develop a better understanding of the potential opportunity for branded DF hirakaku lumber, two focus groups sessions were held with home builders in Japan. The focus group sessions were supplemented by personal interviews with Japanese post and beam

home builders and pre-cutters, the two major end-users of DF hirakaku. Finally, visits were conducted to the major DF sawmills in Japan to develop a better understanding of the competitive role of Japanese DF lumber producers in the market and to explore the role of branding in the marketing of domestically sawn Japanese DF lumber.

Material use in the residential construction industry has been affected by several regulatory changes in Japan. In May, 1998 the Building Standard Law of Japan (BSL) received its first major revision since 1950. To a large degree these revisions were in response to the widespread devastation caused by the Kobe earthquake in 1995 and the perception that the structural performance of wooden post and beam homes, as well as the regulation of construction practices, needed to be improved to ensure the safety of homeowners in Japan. However, the single most important factor affecting the use and specification of structural softwood lumber for use in residential construction in Japan has been the Housing Quality Assurance Act (HQAA). The HQAA was promulgated to improve the quality and performance of new homes and provide homebuyers with specific safeguards and rights when purchasing a new home. The HQAA was developed partially in response to the poor performance of post and beam houses in the Kobe earthquake, but also in response to increasing complaints from home buyers about construction defects and the lack of responsiveness on the part of home builders in correcting those defects.

Japan's domestic lumber industry presents a contrast to the overall low level of timber self-sufficiency. Whereas over 80% of Japan’s total timber supply is derived from imports, only about 40% of Japan's softwood lumber demand is provided by imports. Despite Japan's relatively high level of self-sufficiency in softwood lumber, the domestic lumber industry is characterized by declining production levels as smaller, less efficient sawmills have closed down. The domestic sawmill industry was particularly hard hit by the Asian economic crisis, with the number of sawmills declining from 14,028 in 1996 to 12,810 in 2001. These sawmill closures resulted in large declines in productive capacity from 1997 to 1998. Over the past five years, domestic lumber production has declined from 25 million m^3 to less than 14 million m^3 (and the number of sawmills in 2006 has declined to 8,590), while lumber imports have increased to approximately 9 million m^3. The combination of declining domestic lumber production and slowly increasing import volumes means that self-sufficiency dropped from 74% in 1991 to the current 60%.

Recent developments in Japan and the US have favorably affected the competitive position of US softwood lumber in Japan and renewed US exporters interest in the Japanese market. The weakening of the US dollar relative to its major competitors in Japan, a weak US housing market and the announced export tariffs on Russian logs all bode well for US lumber in Japan. Therefore, it is in the US forest products industry’s best interest to work to work with their Japanese customers to convince Japanese home builders and home buyers that using DF hirakaku is worth the small price premium it commands in the market. For example, a promotional campaign emphasizing the strength, durability and natural beauty of Douglas-fir structural lumber could be very helpful in Japan. In the absence of this type of promotional effort, DF hirakaku products can be expected to continue losing market share in the long-term. One recent estimate derived from interviews with pre-cutters and lumber wholesalers suggests that between 2000 and 2010 the market share for DF hirakaku could shrink from 83% in 2000 to 70% in 2010.

There are a number of factors that constrain the competitiveness of solid sawn US DF hirakaku in Japan, including: high cost of kiln drying large size DF hirakaku, the difficulty in shipping green hirakaku to Japan without developing surface mold and discoloration, the difficulty in maintaining a stable moisture content for kiln dried DF hirakaku during the shipping period to Japan, price fluctuations, reluctance to cut to the lengths required by pre-cutters, the size of the domestic Japanese DF sawmill industry, the high cost of maintaining inventory in Japan, the ready availability of lower cost hirakaku products from domestic DF sawmills and foreign glulam suppliers, the extremely large number of hirakaku size combinations that require a huge number of different hirakaku product sizes (approximately 140 size combinations) and the attendant high inventory costs, and the difficulty in establishing an effective distribution system in Japan.

Given the serious constraints associated with establishing and maintaining an adequate supply of imported DF hirakaku in Japan, we would recommend that the US industry not develop a branding program for DF hirakaku in Japan. This decision is further supported by the fact that there is currently a large, well established domestic DF sawmill industry in Japan. The fact that Japanese DF sawmills have already developed branded hirakaku products further supports this recommendation. It is difficult to see where US sawmills would have a competitive advantage over Japanese sawmills producing branded products, particularly considering the well established distribution channels that the Japanese sawmills have already developed within the pre-cutting and home building industries. Despite this, there are substantial opportunities for US DF sawmills to establish direct supply relationships with medium-sized regional homebuilders and larger national homebuilders. These homebuilders have become extremely cost conscious in the past decade and many expressed interest in purchasing building materials directly from US sawmills as a way to reduce distribution channel costs and improve product quality.

In addition, there is a good opportunity to export kiln dried DF glulam lamina to glulam manufacturers in Japan. This is particularly true if the US industry were to promote DF glulam hirakaku as a superior product to either European whitewood or redwood glulam. However, it would be important for US lamstock producers to resolve the forward pricing issue that currently provides European glulam manufacturers with a competitive advantage. There is also an opportunity to export lamstock produced from other species as well. For example, Alaska yellow cedar lamstock for glulam sill plates (*dodai*) and Sitka spruce for glulam hirakaku. Further research would be required to develop a better assessment of the potential for exporting lamstock to Japanese glulam manufacturers.

Table of Contents

Page

LIST OF FIGURES

Page

List of Tables

1.0 Introduction

US exports of softwood lumber have been declining for more than a decade. This is the result of expanding Canadian lumber exports to Japan over the period 1990-1996 followed by the explosion of lumber exports from Europe over the period 1993-2005. This supply shift has been attributed to a variety of factors including the strength of the US dollar during the period 1996-2001, the Asian Economic Crisis, the continuing Japanese economic malaise, increasing price sensitivity of Japanese home buyers and home builders, regulatory changes in the Japanese housing industry, a shift from site built to factory pre-cut housing, the aggressive marketing by European lumber suppliers in Japan and the continued strength of the US housing market.

For fifteen years between 1989 and 2004, US exports of softwood lumber were mired in decline. During this period, the volume of US softwood lumber exports plunged from approximately 8 million m^3 to less than 2 million m^3. This trend was a reflection of the relatively strong dollar which undermined the competitiveness of US softwood lumber, coupled with regulatory changes in major export markets (particularly Japan) and a strong housing market in the US. This combination of adverse factors influenced many US softwood lumber manufacturers to abandon their traditional export markets. This was especially evident in Japan where US exports of softwood lumber dropped from 3.5 million m^3 in 1989 to just 121,794 m^3 by 2006.

Recent years have seen a rapid reversal in some of the macroeconomic factors affecting the US softwood lumber industry. The US dollar has weakened considerably against both the Canadian dollar and the euro, greatly increasing the competitiveness of US wood products in export markets. Since 2002 the US dollar has weakened by 33.7% against the Canadian dollar (and is now almost at par with the Canadian currency) and by 34.1% against the euro, Figure 1.1. This alone has substantially increased the competitiveness of US softwood lumber in most markets.

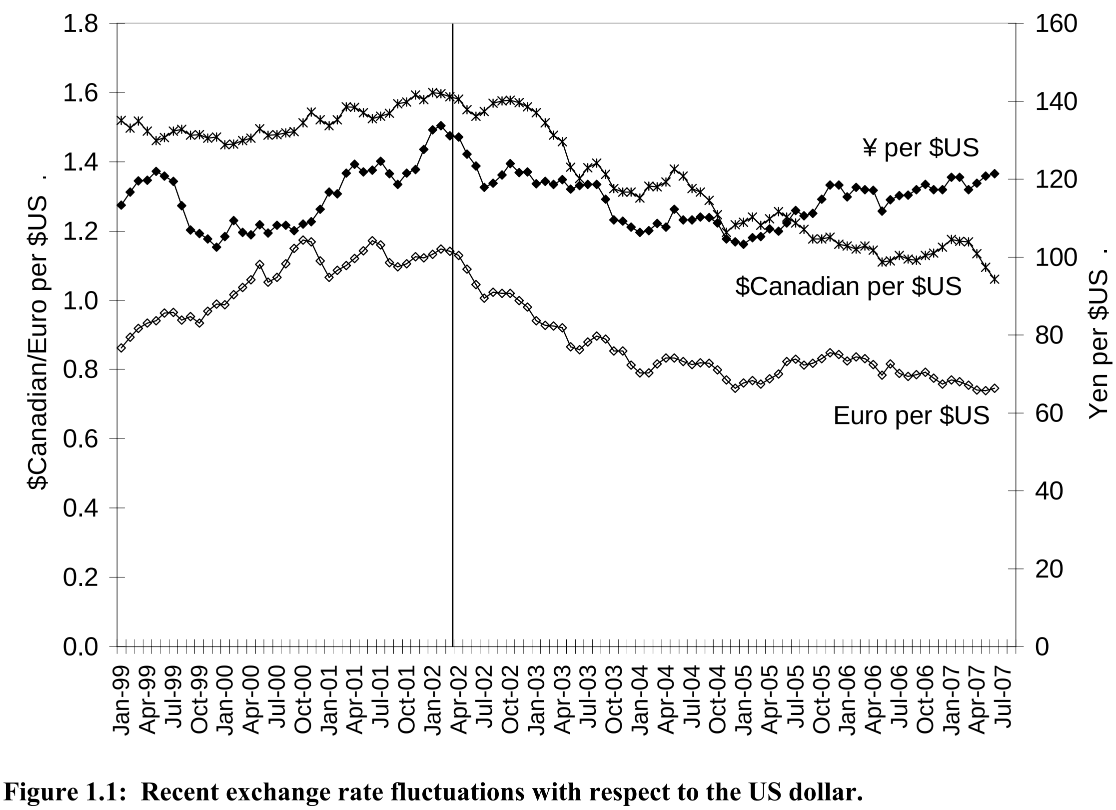

Figure 1.1: Recent exchange rate fluctuations with respect to the US dollar.

At the same time, demand for softwood lumber in the US has fallen substantially as a result of the weak housing market. Since 2005, housing starts in the US have declined by 12.8% from 2.06 million starts in 2005 to 1.8 million starts in 2006. Housing starts are projected to drop further in 2007 to between 1.5-1.6 million. In response to the weak housing market, demand for softwood lumber in the US dropped by 6.4%, from 64.3 bbf in 2005 to 60.1 bbf in 2006. More worrying is the fact that US softwood lumber demand is projected to drop to 54.2 bbf in 2007 before recovering only slightly in 2008 to 56.7 bbf.

With prices low and demand weak in the US market, many softwood lumber manufacturers have begun looking offshore again. Between 2004 and 2006, the volume of US softwood lumber exports grew by 18.6% to reach 2.2 million m^3. More importantly, the value of softwood lumber exports has jumped by 35.5% to reach $592 million. Softwood lumber exports have remained strong during the first four months of 2007, with exports increasing by 14.5% in terms of volume and 25.7% in terms of value. Encouragingly, the strong export performance of softwood lumber has not been confined to a small group of traditional softwood lumber export markets but has occurred across a broad range of markets. In the UK, softwood lumber exports are up by 675% in the four months of 2007, propelling the UK from the 14^{th} largest market to the third largest market for US softwood lumber.

The recent announcement by the Russian authorities of a log export tariff, if implemented even partially, should help US exporters. Finland, the second largest supplier of softwood lumber to Japan, relies to a large extent on Russian logs for their raw material supply into the Japanese market. The higher price of Russian logs, in conjunction with the strong euro, should provide US softwood lumber exporters with a substantial competitive advantage in China, Japan, and South Korea where imports of Russian logs totaled 19.1 million m^3, 5.1 million m^3, and 2.0 million m^3, respectively, in 2006.

During this transition in the Japanese market, the competitiveness of the two major softwood lumber species exported to Japan from the US have been affected in different ways. Hemlock (primarily used for posts (*hashira*) in post and beam construction), were initially displaced by hemlock posts from Canada. Hemlock from both the US and Canada was subsequently displaced to a large degree by European whitewood glulam posts. This substitution has been attributed to changing materials preferences within the pre-cutting industry (based largely on performance and quality factors) and to the increasing price sensitivity of Japanese home builders. The willingness of European exporters to provide forward pricing contracts of up to one year has also had an important influence on the success of European lumber in Japan.

In contrast, Douglas-fir (DF) lumber (used primarily for beams (*hirakaku*) in post and beam construction) continues to enjoy success in Japan. This success can largely be attributed to the superior performance (with respect to strength, straightness, dimensional stability, and visual appearance) of DF relative to other timber species. Thus, DF has maintained a reputation as the premier timber species for *hirakaku* applications. Yet despite this strong reputation, DF has also seen its market share slowly eroded by alternative lumber products such as European redwood glulam lumber. The primary basis for this trend has been the shift towards pre-cut housing components as well as the price sensitivity of Japanese home builders and pre-cutting manufacturers.

Given the history of superior performance and the stellar reputation of Douglas-fir in beam applications, in conjunction with the weak US dollar, US DF lumber manufacturers have an opportunity to expand their exports of DF hirakaku and other structural components in Japan. A recent market research report conducted by R. E. Taylor and Associates (and commissioned by the American Forest & Paper Association) suggests that one potential opportunity for Douglas-fir lumber manufacturers might involve developing a DF brand that would allow US exporters to shift the basis of competition away from low price to a combination of price and performance. In other words, a US branded DF hirakaku would be marketed on the basis of value (the ratio of performance per unit price) rather than simply low price. The challenge here would be to develop a strategy that would help US exporters communicate the superior value of DF hirakaku to Japanese home builders and pre-cutters. Equally important, the promotional strategy would support Japanese home builders and pre-cutters in communicating the benefits of DF hirakaku to home buyers. Ultimately, the success of this type of program would require a long-term commitment to the Japanese market by US suppliers.

The objective of this research was to evaluate the use and specification of structural lumber within the Japanese post and beam construction market, particularly with respect to Douglas-fir lumber in beam applications. In addition, this project follows up on the recommendation of an earlier marketing report recommending that US Douglas-fir manufacturers consider the feasibility of developing and introducing branded DF hirakaku lumber in Japan. In order to develop a better understanding of the potential opportunity for a branded DF hirakaku product, two focus groups sessions were held with home builders in Japan. The focus group sessions were supplemented by personal interviews with Japanese post and beam home builders and pre-cutters, the two major end-users of DF hirakaku. Finally, visits were conducted to the major DF sawmills in Japan to develop a better understanding of the competitive role of Japanese DF lumber producers in the market and to explore the role of branding in the marketing of domestically sawn Japanese DF lumber.

2.0 Timber Supply and Demand

Timber Self-sufficiency

During the post-war era, Japan went from being essentially self-sufficient in supplying its timber demands to relying on imports for more than 80% of its timber requirements (Figure 2.1). From 1955-2005, domestic timber production steadily declined from approximately 65 million m^3 to less than 17 million m^3. Timber imports, on the other hand, have increased tremendously, jumping from 2.5 million m^3 in 1955 to almost 90 million m^3 in 1996 before dropping off to 72 million m^3 in 2005. Overall, timber demand has generally followed the economy, increasing during periods of economic growth (1960-1973, 1975-1979, and 1985-1989 and 2005-2007) and declining during periods of economic decline (1972-1974, 1979-1985, 1989-1997 and 1997-2005). Although timber demand experienced a sharp decline following the Asian economic crisis, most of the reduced demand was reflected in lower timber imports whereas domestic production volumes remained relatively constant during the period 1998-2006.

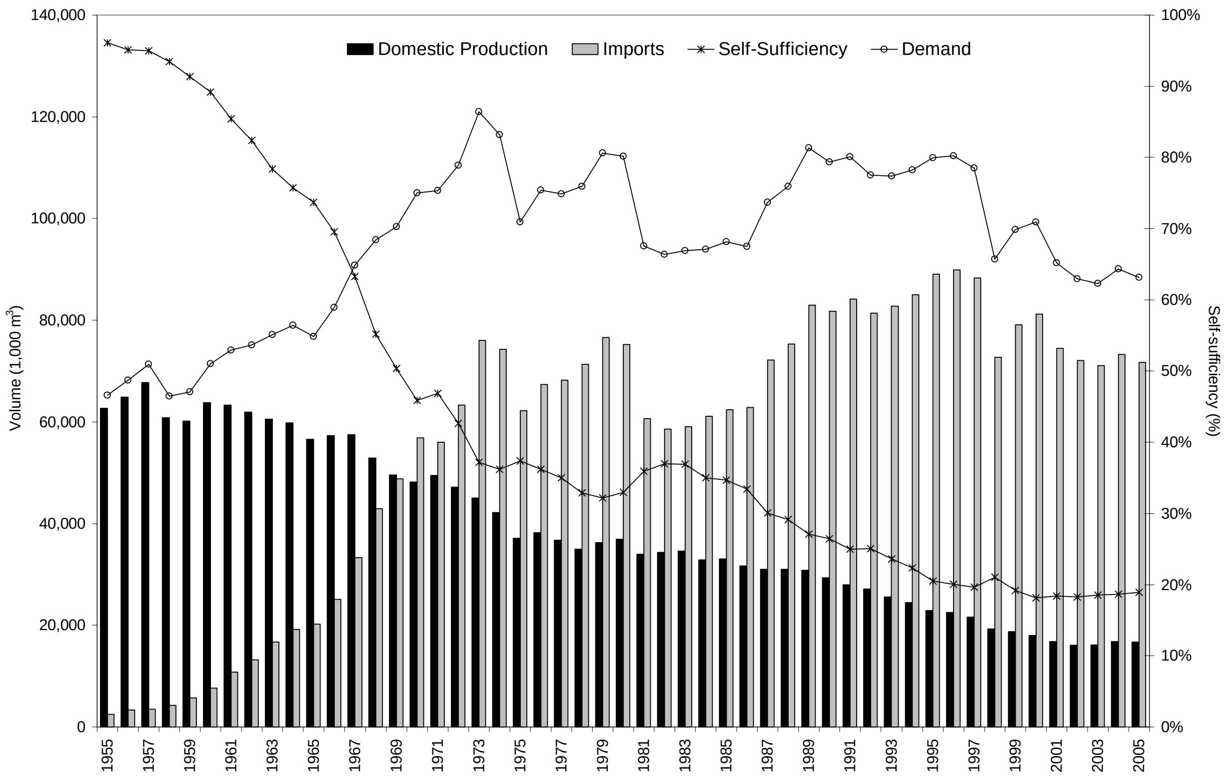

Figure 2.1: The trend in Japanese timber self-sufficiency and imports, 1955-2005.

Lumber Self-sufficiency

Japan's domestic lumber production volumes present a contrast to its overall timber self-sufficiency. Whereas over 80% of Japan's total wood supply is derived from imports, only about 40% of Japan's softwood lumber demand is provided by lumber imports (Figure 2.2). Despite Japan's relatively high level of self-sufficiency in softwood lumber, the domestic lumber industry is characterized by declining production levels as smaller, less efficient sawmills have closed down. The domestic sawmill industry was particularly hard hit by the Asian economic crisis, with the number of sawmills declining from 14,028 in 1996 to 12,810 in 2001. These sawmill closures resulted in large declines in productive capacity from 1997 to 1998 (Figure 2.2). Over the past five years, domestic lumber production has declined from 25 million m^3 to less than 14 million m^3 (and the number of sawmills in 2006 has declined to 8,590), while lumber imports have increased to approximately 9 million m^3. The combination of

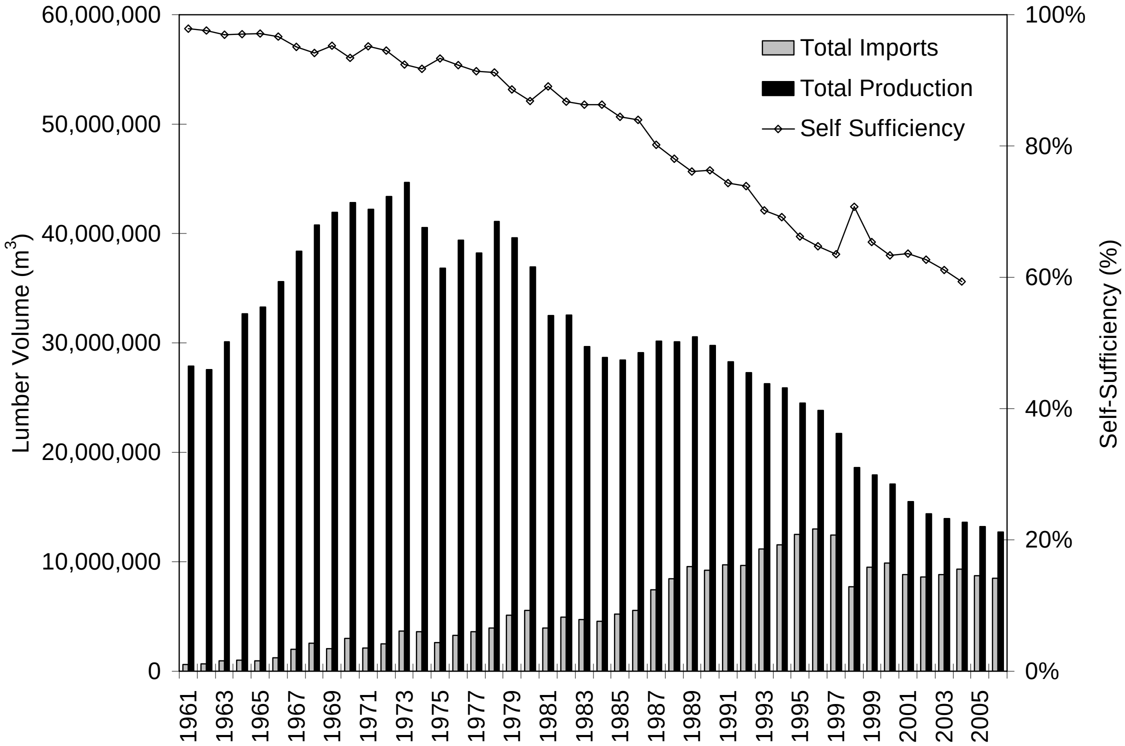

Figure 2.2: Japanese total production, imports, and self-sufficiency of lumber, 1961-2006.

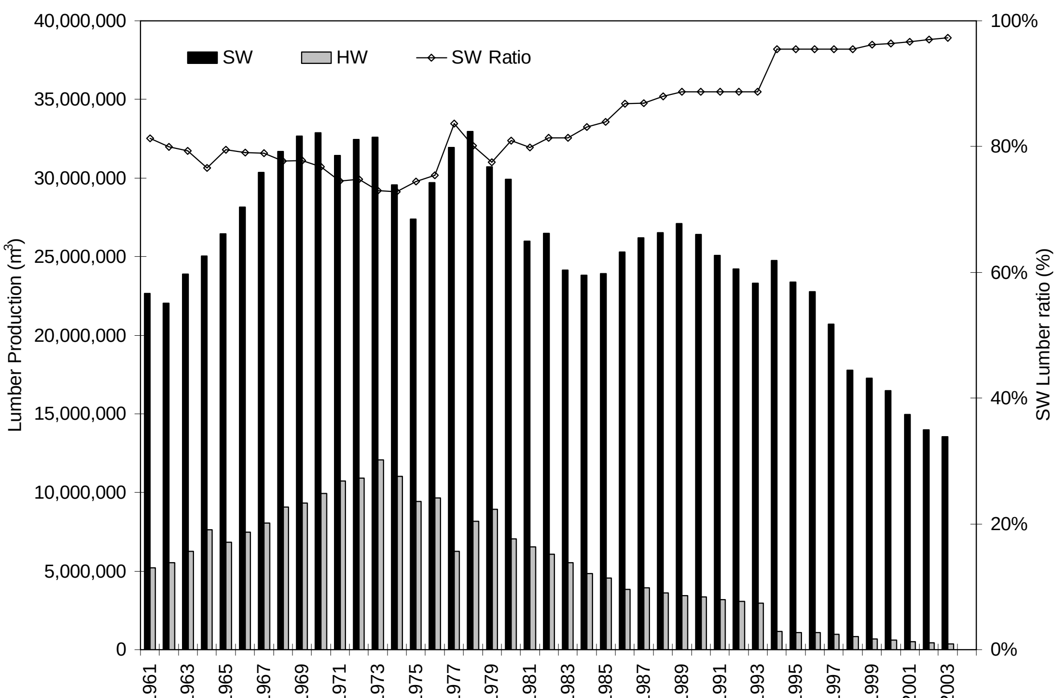

Figure 2.3: Japanese production of softwood and hardwood lumber, 1961-2006.

declining domestic lumber production and slowly increasing import volumes means that self-sufficiency dropped from 74% in 1991 to the current 60%.

The closure of mills has had a much more devastating impact on the hardwood lumber industry (Figure 2.3). Hardwood lumber, which peaked at 27% of domestic lumber production in 1973, had dwindled to just 2.7% by 2006. As a result, Japanese self-sufficiency in hardwood lumber has plummeted from 85% to just 33% over the past twenty years whereas self-sufficiency in softwood lumber suffered a more modest decline over the same period.

3.0 An Overview of the General Market in Japan

The Japanese import data shows that softwood lumber is the dominant lumber product imported into Japan and the ratio of softwood lumber imports to total lumber imports has increased steadily from 78% in 1989 to 92% in 2006 (Figure 3.1). Give the dominance of softwood lumber in total lumber imports, the remainder of this report will deal exclusively with softwood lumber. The composition of softwood lumber imports has changed dramatically over the past 15 years, a fact that is often obscured by the overall trend in import volumes. The fact that imports of softwood lumber remained constant between 1991 and 2006 (at 8.1 million m^3) suggests that softwood lumber imports into Japan have changed little over this time (Figure 3.2). In reality, a closer analysis of the Japanese import statistics presents a much different story. Imports of softwood lumber grew rapidly during the period 1990-1996, driven largely by high levels of housing starts and a pending increase in the consumption tax that would be applied to house sales. The Asian economic crisis resulted in a substantial drop (36%) in softwood lumber imports in 1998 although softwood lumber imports rebounded by 18% from 1998-2004.

The past decade has seen a tremendous shift in the structure of softwood lumber imports into Japan, Figure 3.2. During the period 1990-2006, the US has seen its share of softwood lumber imports plummet from 27.8% to 1.1%. Over the same period, the Canadian share of softwood lumber imports remained relatively stable at approximately 40.3%. It is important to note that the Canadian market share, which averaged 53% during the period 1990-1998, declined to 40.3% during the period 1998-2006. In contrast to the US and Canadian experience, imports from Europe shot from essentially zero in 1992 to a 31.9% market share in 2006 (Figure 3.3). Similarly, imports from Russia increased from 3.5% to 13% of softwood lumber imports between 1992 and 2006.

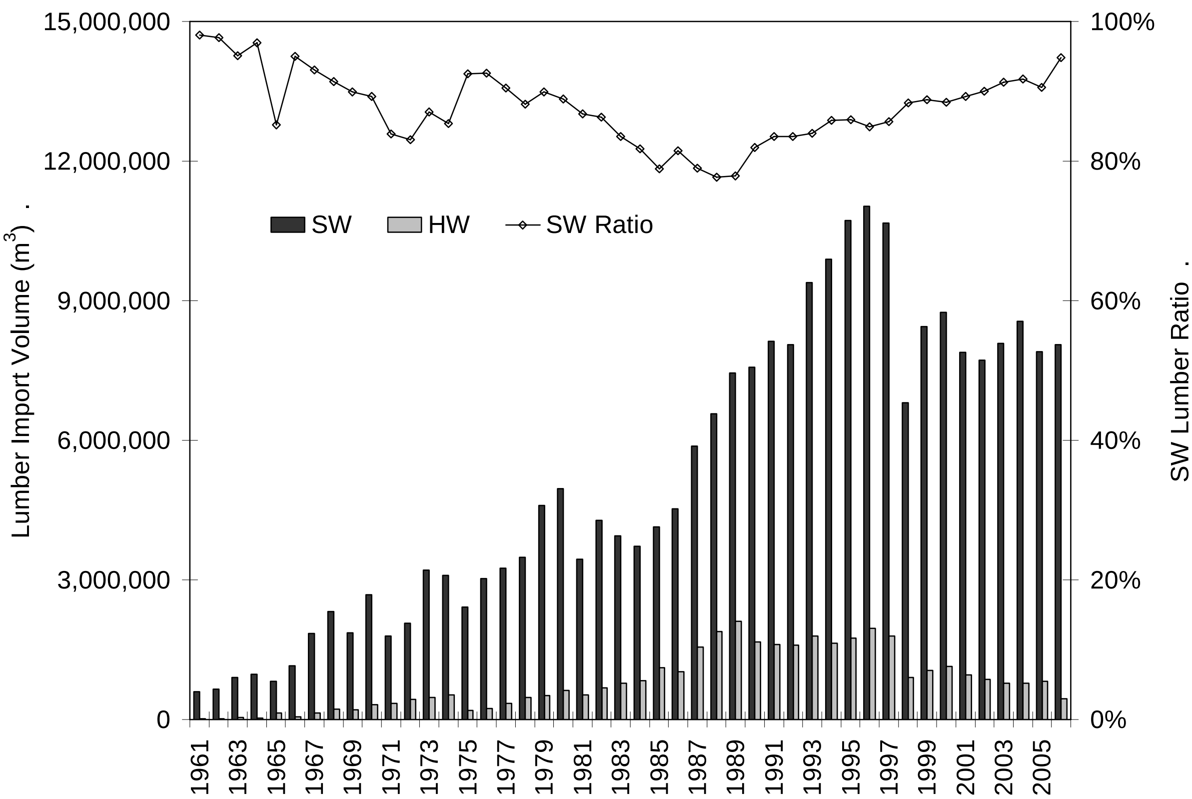

Figure 3.1: Japanese imports of softwood and hardwood lumber from 1961-2006.

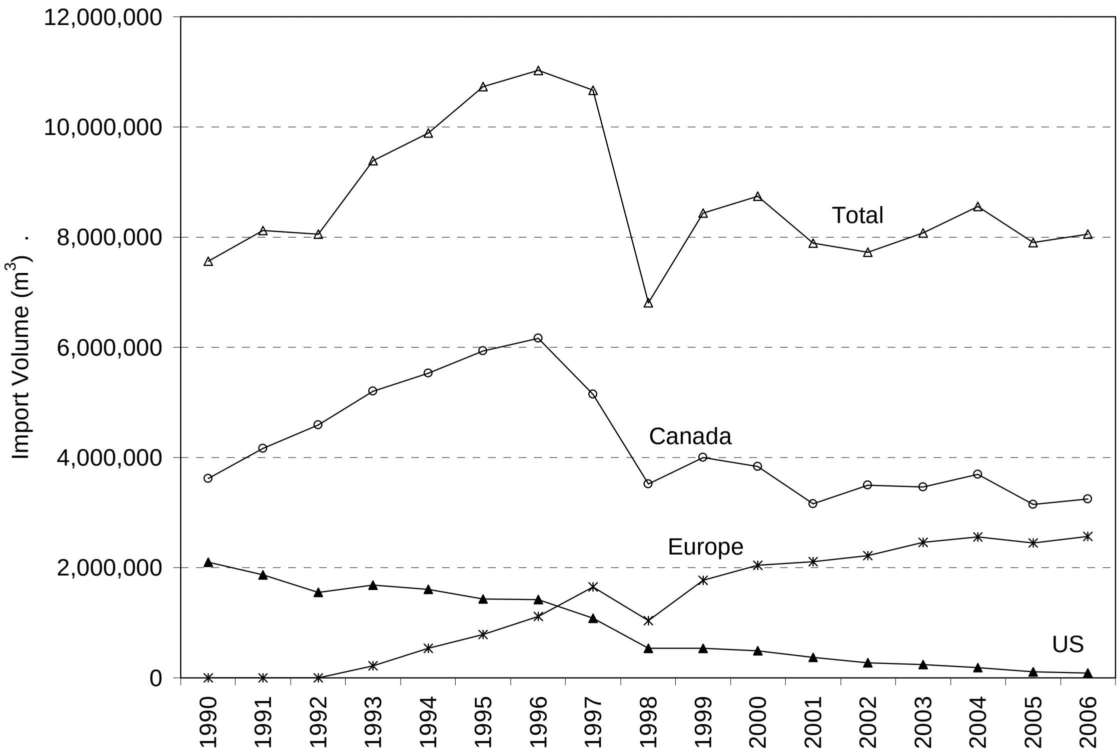

Figure 3.2: Japanese softwood lumber imports by source, 1990-2006.

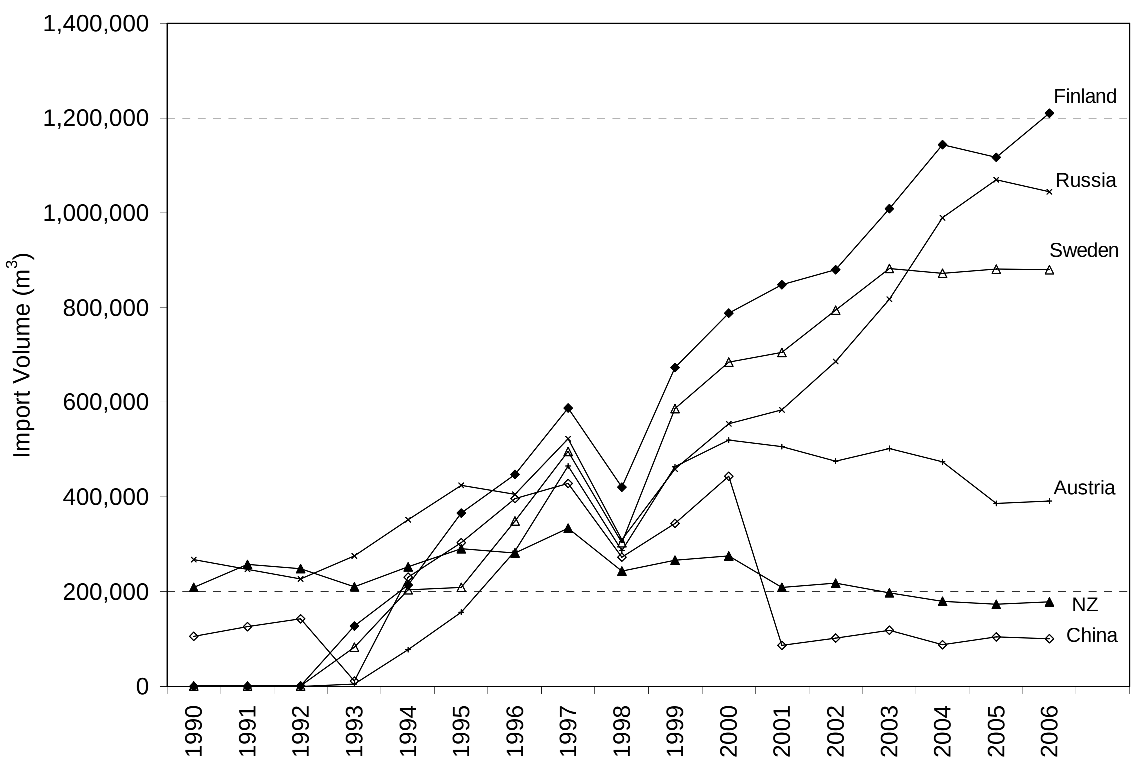

Figure 3.3: Japanese softwood lumber imports from non-North American sources, 1990-2006.

However, more problematic is the fact that as Japanese lumber imports have continued to expand following the Asian crisis (increasing to 8,059,819 m^3 in 2006), US exports of softwood lumber have continued to decline. In contrast, lumber imports from a wide variety of non-North American suppliers have registered significant increases over the period 1998-2006 (Figure 3.3). For example, the main European suppliers of Finland, Sweden, and Austria, saw their exports to Japan increase by 187%, 190%, and 36%, respectively from 1998 to 2006. More importantly, their share of the Japanese imported softwood lumber market increased substantially over this period, with Sweden increasing their market share from 4.5% to 10.9%, Finland increasing from 6.2% to 15%, and Austria moving from 4.2% to 4.9%.

Douglas-fir Log and Lumber Imports

Douglas-fir (DF) has traditionally been a preferred species for structural components and has been used extensively in the residential construction industry in Japan. Much of the preference for DF is related to its high strength characteristics as well as its dimensional stability, durability, straightness and attractive appearance. The ready availability of close grained old-growth DF logs and lumber in the past also helped to establish the strong preference for this species. In fact, the preference for DF lumber has been so strong that an important segment of the Japanese sawmill industry has developed to process imported DF logs into structural lumber for the post and beam home building industry.

Similar to the trend seen with softwood lumber in general, the imports of both DF logs and lumber from the US have been declining. In the case of logs, the decline has been going on since 1989 when exports of DF logs to Japan peaked at 6.8 million m^3 (Figure 3.4). Since 1989, total imports of DF logs have declined by 62%, totaling just under 3 million m^3 in 2003 before increasing slightly in 2006. The US is the primary supplier of DF logs to Japan, primarily because of the restrictive log export regulations in Canada that are applied to logs harvested from provincial forests. While a similar export ban on logs from public lands in the US was put in place in 1990, the large area of private industrial forests in the US Pacific Northwest was not affected and has helped to partially offset the US log export ban. However, structural changes in the Japanese market have reduced the demand for DF logs. While Canadian exports of DF logs have increased since 1997, the existing log export constraints most likely preclude a significant expansion of log exports and, indeed, log exports have declined in recent years.
The time series for DF lumber imports into Japan is relatively short due to the fact that prior to 1997 much of the planed DF lumber was grouped with all other planed softwood lumber species under the Harmonized System code 4407-10.320 (SW lumber, planed, not specified elsewhere). Beginning in 1997, the Japanese customs agency implemented new HS categories for individual softwood species, including planed DF lumber (HS:4407-10.323). While rough cut DF lumber did have its own HS codes for widths less than 16 cm and greater than 16 cm (4407-10.381 and 4407-10.389, respectively), it is impossible to separate out the planed component of DF lumber prior to 1996. We have obtained limited data from the Japan Lumber Importers Association that allows us to take the DF planed lumber import data back to 1991 but that is as far back as we can accurately estimate DF lumber imports to Japan.

Douglas-fir lumber exports from North America to Japan peaked in 1996 at 2 million m^3, declined precipitously in 1997 and 1998, recovered somewhat during 1999 and 2000, declined again during 2001and 2002, stabilized at around 950,000 m^3 from 2002-2004 and dropped further from 2005-2006.(Figure 3.5). Throughout this period, the US has continuously seen it market share decline from 47.6% in 1991 to just 11% in 2006. In contrast, over the same period Canadian market share increased from 52.4% to 89%. Perhaps more importantly, even as the total volume of DF lumber imports declined by 52.6%, the share of DF lumber in total softwood lumber imports declined from 26.6% in 1996 to 7.6% in 2006. Despite this, the Japanese market remains an important market for North American producers of DF logs and lumber.

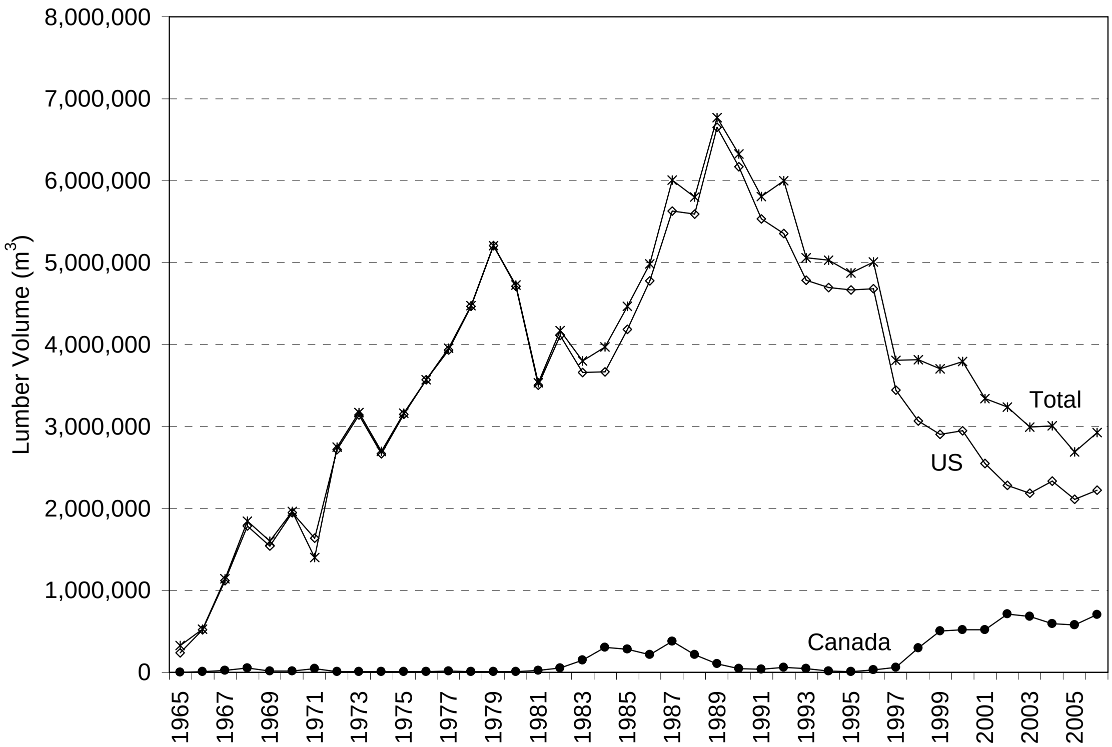

Figure 3.4: Japanese imports of Douglas-fir logs, 1965-2006.

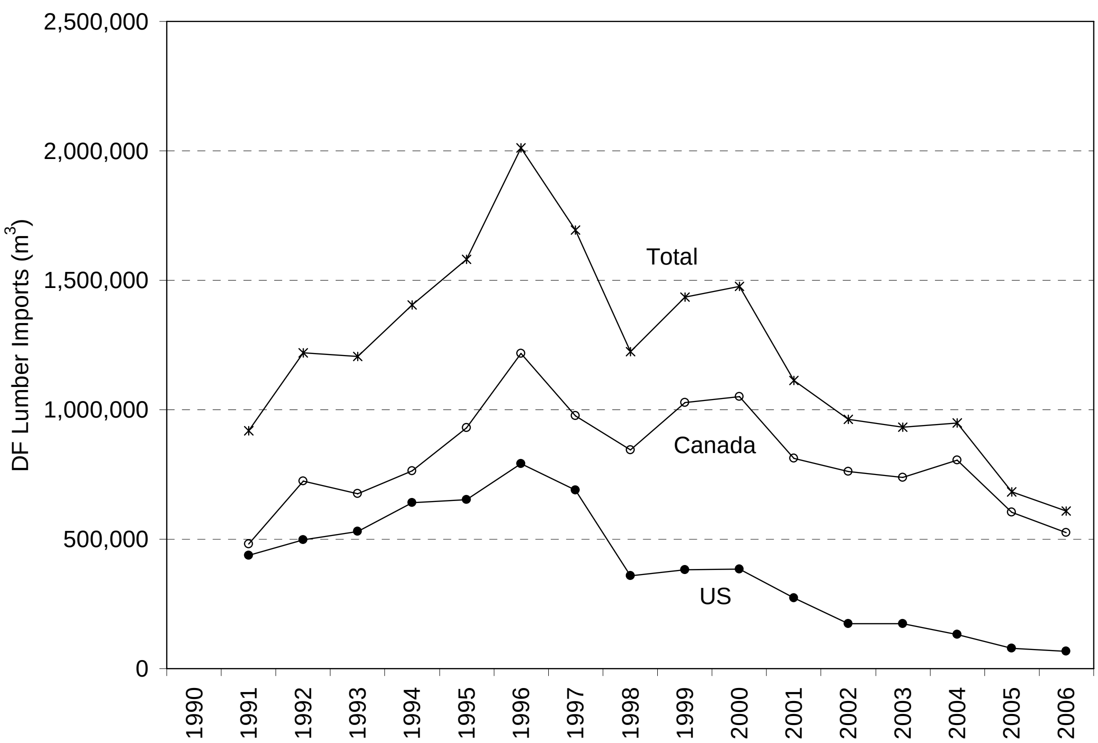

Figure 3.5: Japanese imports of Douglas-fir lumber, 1991-2006.

4.0 Glulam Imports

One of the primary substitutes for solid sawn DF beams in post and beam construction in Japan has been glue laminated (glulam) beams. In contrast to the trend observed with softwood lumber, both imports and domestic production of glulam lumber have been increasing rapidly since 1998 (Figure 4.1). The increased demand for glulam lumber is a direct result of the Kobe earthquake and the resultant increased use of pre-cut structural components within the post and beam construction industry. Prior to the Kobe earthquake, most glulam lumber was non-structural for use in the furniture industry. The glulam data show that in 1991 the ratio of structural glulam lumber in the total glulam supply was 27.8%. By 2006, this ratio had jumped to 88.9%. The increased demand for glulam lumber in Japan has been met by both a rapid increase in domestic production as well as a more moderate increase in imports. Domestic production of glulam lumber jumped 133% from about 340,000 m^3 in 1996 to almost 1.7 million m^3 in 2006. At the same time, imports of structural glulam lumber increased by 248% to reach 805,562 m^3 in 2006. As a result of the rapid increase in domestic production of structural glulam lumber, Japan's self-sufficiency increased from 58% in 2000 to 65% in 2006.

The US found itself occupying a strong position in the structural glulam market in Japan following the Kobe earthquake. As the demand for structural glulam lumber prepared to take off in 1993, the US was the dominant supplier in Japan with an 85.2% market share. Despite the fact that US exports of structural glulam lumber more than doubled between 1993 and 1996, growing from 50,412 m^3 to 119,365 m^3, the US share of the market dropped to 51.6% as new competitors began to enter the market. However, a strong US dollar and a strengthening housing market in the US caused many US lumber manufacturers to lose interest in Japan. This trend was further acerbated by an emerging price sensitivity in Japan that had not existed over the past twenty years. As a result, the US share of the market had shrunk to just 0.1% by 2006. In contrast, European glulam lumber held the dominant market share at 63.8% while China had increased its market share to 21.1%. The entrance of China into this market in 2001 greatly undermined both the US and European market positions. Between 2001 and 2006 the Chinese market share increased

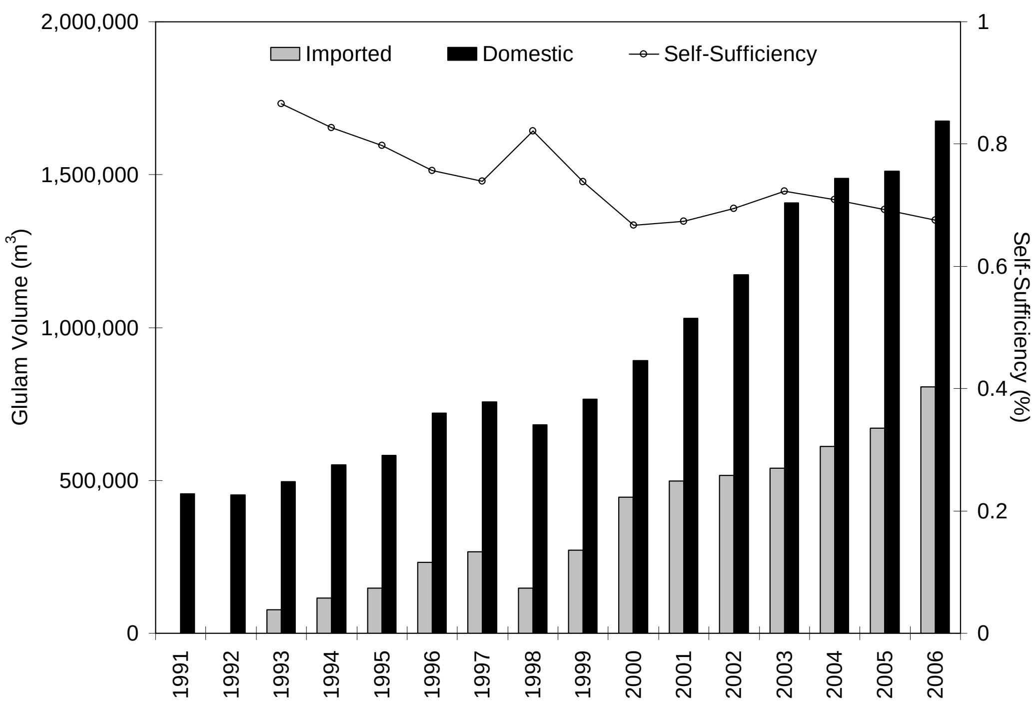

Figure 4.1: Japanese production, imports, and self-sufficiency of structural glulam lumber, 1991-2006.

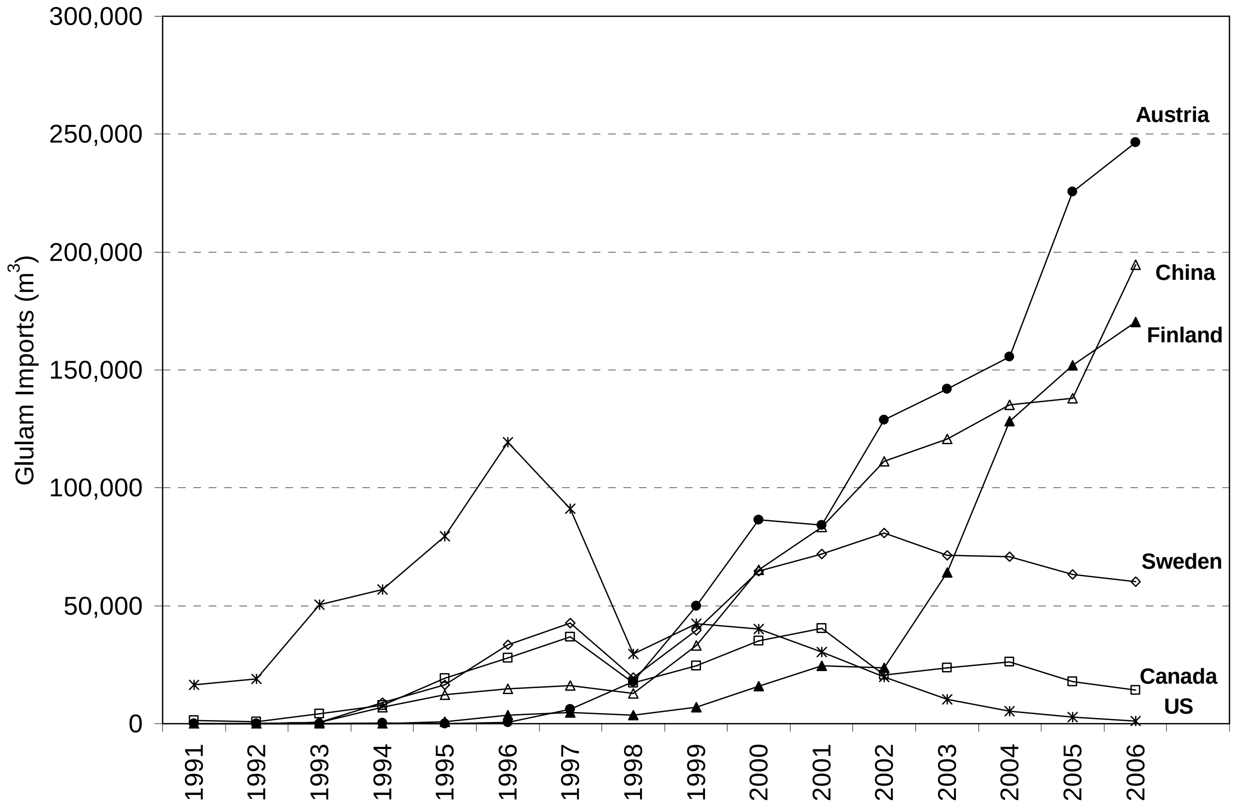

Figure 4.2: Structural glulam lumber imports by source, 1991-2006.

from 4.9% to 21% whereas the US market share dropped from 6.1% to 0.1% and the European market share dropped from 74.9% to 63.8%. Furthermore, initial trade statistics suggest that Chinese exports of structural glulam lumber to Japan could double by 2010.

5.0 Wood Use in Residential Construction

Regulatory Changes Lead To Increased Use Of Precut

In May, 1998 the Building Standard Law of Japan (BSL) received its first major revision since 1950. To a large degree these revisions were in response to the widespread devastation caused by the Kobe earthquake in 1995 and the perception that the structural performance of wooden post and beam homes, as well as the regulation of construction practices, needed to be improved to ensure the safety of homeowners in Japan. The major revisions to the BSL: (1) specified that interim and final building inspections be performed and (2) transformed the BSL from a specification-based building code to a performance-based building code. The first revision of the BSL requires that all residential housing units receive an interim and final building inspection. Further, completion of the interim inspection is required before a building is eligible to receive its final inspection. Since there were only approximately 1,800 building inspectors in Japan in 1995, the BSL revisions allowed private construction inspection firms to be established. To provide guidance to the private inspection firms, a qualification system and inspection standards were established within the revised BSL. For the first time, contractors are now allowed to obtain a construction inspection permit from either a private construction inspector or an inspector from the local government agency.

The second revision transformed the BSL from a specification-based code to a performance-based code. As a result, any building material that meets the performance standards can be used in residential construction. The implications of this second change, at least on paper, were profound. In the past, approved structural building materials were specified in the building code. However, the change to a performance-based building code opened the door for any building material to be used, provided approved product testing showed that it met the in-service specifications mandated by the appropriate government ministry (initially the Ministry of Construction and later the Ministry of Land, Infrastructure and Transportation.

However, the single most important factor affecting the use and specification of structural softwood lumber for use in residential construction in Japan has been the Housing Quality Assurance Act (HQAA). Although the HQAA didn't become effective until April, 2000, it had begun to have an impact on material specification and use well before its implementation. The HQAA was promulgated to improve the quality and performance of new homes and provide homebuyers with specific safeguards and rights when purchasing a new home. The HQAA was developed partially in response to the poor performance of post and beam houses in the Kobe earthquake, but also in response to increasing complaints from home buyers about construction defects and the lack of responsiveness on the part of home builders in correcting those defects. It also was designed to protect homebuyers from the increasing incidence of home builders taking substantial down payments for new home projects and subsequently going out of business before the home was built (or in some cases even started). The four objectives of the HQAA include: (1) improving the quality and performance of residential homes, (2) providing homebuyers with a mechanism for resolving disputes with building contractors, (3) establishing a voluntary system of "Housing Performance Indication Standards" against which individual houses can be compared, and (4) establishing a housing completion guarantee system. The HQAA, which went into effect in April 2000, has significantly changed the structure of the residential construction industry in Japan, including the specification and use of domestic and imported wooden building materials. The two main components of the HQAA that have the greatest impact on material use and specification are summarized below.

The first major objective of the HQAA was aimed at improving the quality and performance of new homes by requiring homebuilders to provide homebuyers with a 10 year warranty against structural defects (e.g., poor earthquake resistance) 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 prescriptive judgment criteria.

The second major objective of the HQAA was to establish a voluntary system of "Housing Performance Indication Standards" against which the performance of individual houses built by different home builders could be compared. The specific performance criteria included in this provision of the HQAA are: (1) structural performance, (2) fire safety, (3) durability, (4) ease of maintenance and management, (5) energy efficiency, (6) air quality, (7) ratio of exterior openings to total wall area, (8) noise transmission, and (9) barrier free design (this is particularly important for homes with elderly people with reduced mobility). The performance of an individual house is judged by a "Designated Evaluation Body" using the criteria established in the "Housing Performance Indication Standards". These evaluation bodies are not only responsible for approving the architectural design of the house, but also perform inspections of the foundation, structural framing, and interior finishes of the home. Houses that are judged to meet or exceed the performance indication standards receive certification as a "Performance Recognized House", thus providing builders with a way to differentiate their homes from those of their competitors. It is important to note that each of the nine performance criteria have different performance levels, allowing the builder and home buyer to customize a home based on the home buyers desires and budget (Table 5.1). For example, there are three performance levels specified under the structural performance category. The base level meets the performance requirements specified in the BSL while the second and third levels exceed the BSL requirements by 1.2 and 1.5 times, respectively.

Another factor which has promoted the greater use of pre-cut structural components is related to the demographic changes taking place in the residential construction industry and the carpenters who build houses. Fewer and fewer young people have entered the carpentry field and, as a result, the number of trained carpenters has been shrinking rapidly. Between 1999 and 2004 the number of trained carpenters dropped from 129,625 to 103,700. It is expected that the number of carpenters will continue to shrink rapidly over the next decade, further driving the shift to pre-cut structural components.

Species Use in Precut Applications

The net impact of these regulatory and demographic changes has been to transition the residential homebuilding industry away from the traditional site built house (where structural components were cut on-site by master carpenters) to the pre-cut system (where structural components are cut to exact tolerances at computer aided machine centers). The change towards pre-cut components means that homes can be built by less experienced carpenters since the pre-cut components only need to be assembled (rather than cut and fitted) on the construction site. To be sure, the industry had been slowly moving towards the increasing use of pre-cut structural components since the early 1980's. In 1985 the percentage of wooden post and beam homes that used pre-cut structural components was just 3%. By 1995 (the year of the Kobe earthquake) this figure had increased to 32%. In response to the regulatory and demographic changes following the Kobe earthquake, the share of wooden homes built using the pre-cut method exceeded 85% by 2006.

The HQAA also had a profound impact on the type of structural lumber used in building residential homes in Japan. In traditional site built houses, carpenters generally used green lumber for the posts and beams. Interlocking joints were cut on-site by carpenters, were assembled and the green lumber was allowed to dry naturally during the extended construction period. Prior to the implementation of the HQAA, it was not unusual for a carpenter using the traditional site-built construction method to take up to 8 weeks to frame a single house. Shifting to the pre-cut system allowed a carpenter to reduce the time required to frame a house to two weeks or less. However, the transition to the pre-cutting of structural components to highly accurate tolerances within a factory setting meant that the demand for dimensionally stable, kiln-dried lumber increased dramatically. This requirement precludes, but does not eliminate, the use of green lumber within the precut operation. While some pre-cutters continue to use green lumber in their manufacturing process, this is largely in response to small local home builders specifications and is generally a cost savings measure on the part of the home builder. In general, kiln dried lumber is used to eliminate shrinkage and ensure the tight fit of the structural components when the structural framework of the house is assembled. As a result, demand for imported structural lumber shifted substantially away from green lumber towards kiln dried lumber. This shift had a profound impact on the competitive position of green hemlock posts in Japan because of the difficulty in drying hemlock lumber to a uniform moisture content. Hemlock lumber, because it contains many areas of high moisture content (often called wet pockets) is difficult and expensive to dry to a uniform moisture content. As a result, the price of kiln-dried hemlock posts increased beyond the price of kiln dried glulam posts being supplied from Europe, Table 5.2.

Another factor that reduced the competitiveness of hemlock posts relative to European whitewood glulam posts is the fact that during the kiln drying process, hemlock lumber with larger cross-sections can warp and twist. However, because glulam lumber is produced from smaller sizes of kiln dried lumber, the final post is very straight and dimensionally stable. The requirement that lumber used within pre-cutting operations needed to be straight with very little crook or bow greatly accelerated the use of structural glulam lumber within the residential construction industry. For example, the use of laminated lumber for vertical posts (*hashira*) has increased from 36% in 1997 to 66% in 2004. Similarly, the use of laminated beams has increased from 22% in 1997 to 70% in 2004. The information in Table 5.1 highlights several trends in material use that have been occurring within the Japanese post and beam industry. The first trend is the increased use of domestic Japanese species that has resulted from subsidies and financial incentives put in place to promote the use of these species within the post and beam sector. The second trend is the increased use of glue laminated lumber in sill plate and beam (*hirakaku*) applications. The third trend is the declining use of solid sawn Douglas-fir lumber in beam applications. While the total market share for Douglas-fir in hirakaku applications was 32.9%, this was down from 48.7% in 2001. In contrast, the use of European red pine glulam beams jumped from 16% to 35.6% in the same period. Finally, treated hemlock is being displaced within the sill plate market by naturally durable species such as Japanese cypress and Alaska yellow cedar that do not require chemical treatment. Between 2001 and 2004, Japanese cypress use in sill plates increased from 13.1% to 24.0% while the use of Alaska yellow cedar jumped from 23.1% to 30.2%, primarily due to the increased use of AYC glulam sills.

Table 5.1. Changing ground sill (dodai) material use within the post and beam industry (%).

Product	Species	2004	2003	2002	2001
Post	**Glulam**	**66.1**	**63.7**	**71.9**	**71.5**
(Hashira)	(Eur. Whitewood)	36.9	39.3	23.2	41.9
	(Eur. Red Pine)	15.2	15.4	11.9	--
	(J. Species)	4.0	--	--	--
	Solid Sawn	**33.9**	**36.3**	**28.1**	**28.5**
	J. Cypress, KD	14.8	14.7	15.0	18.0
	J. Cedar, KD	14.9	18.8	9.6	3.9
	Other	4.2	2.8	3.5	6.7
Structural Beam	**Solid Sawn**	**25.7**	**41.6**	**33.5**	**38.7**
(Hirakaku)	Douglas-fir, Green	2.3	3.8	8.4	9.8
	Douglas-fir, KD	17.0	37.8	25.1	28.9
	J. Cedar, KD	6.4	--	--	--
	Glulam	**70.2**	**55.8**	**62.4**	**56.3**
	(Douglas-fir)	13.6	4.5	6.1	10.0
	(E. White Wood)	21.0	25.5	8.1	19.8
	(Eur. Red Pine)	35.6	25.8	25.6	16.0
	Other	4.1	2.6	4.1	5.0
Sill Plate	**Solid Sawn**	**57.1**	**57.0**	**65.4**	**72.2**
(Dodai)	Hemlock (treated)	15.4	23.0	33.3	36.0
	Yellow Cedar	17.7	15.1	18.3	23.1
	J. Cypress	24.0	18.9	13.8	13.1
	Glulam	**30.2**	**28.9**	**24.8**	**15.9**
	Yellow Cedar	12.5	11.5	8.8	--
	J. Larch	7.1	--	--	--
	Other	12.7	14.1	9.8	11.9

Source: Japan Lumber Reports 2005

Table 5.2: Summary of the Voluntary Performance Criteria

Performance Measure	Level	Performance Criteria
Earthquake Resistance	Rank 3 Rank 2 Rank 1	• Exceeds the BSL by 1.5 times • Exceeds the BSL by 1.2 times • Complies with BSL requirements
Durability	Rank 3 Rank 2 Rank 1	• Life of the structure will equal or exceed 3 generations • Life of the structure will equal or exceed 2 generations • Life of the structure is less than 2 generations
Energy Efficiency	Rank 4 Rank 3 Rank 2 Rank 1	• Established with respect to the heating/cooling burden
Fire Safety	Rank 4 Rank 3 Rank 2 Rank 1	• Exterior walls will resist fire for 60 minutes • Exterior walls will resist fire for 45 minutes • Exterior walls will resist fire for 20 minutes
Indoor Air Quality	Rank 4 Rank 3 Rank 2 Rank 1	• Established with respect to level of formaldehyde emissions from interior finishes and materials
Sound Insulation of Floors	Rank 5 Rank 4 Rank 3 Rank 2 Rank 1	• Established with respect to the thickness of the floor slab, type of floor finishes and materials, etc.
Ease of Maintenance	Rank 3 Rank 2 Rank 1	• Sewer, water, and gas services can be maintained without damaging structure or finishes • Sewer, water, and gas services can be maintained without damaging structure • Sewer, water, and gas services cannot be maintained without damaging structure
Indoor Lighting	%	• Proportion of total area of windows receiving sunlight/floor area of the room
Accessibility	Rank 5 Rank 4 Rank 3 Rank 2 Rank 1	• Established in accordance with the width of corridors, difference in floor height between rooms, presence of handrails in bathrooms, entrances, and staircases, and steepness of stairs, etc.

Table 5.3: Summary of timber species used by pre-cutters in 2002 (m^3).

	Toshibashira (Balloon Post)		Hirakaku (Beam)	
	Volume	Share	Volume	Share
Sugi	24,834.6	23.1%	37,771.8	2.5%
Sugi (EW)	1,418.9		2,811.4	
Sugi (KD)	7,891.4		1,526.4	
Hinoki	28,245.5	30.7%	834.2	0.1%
Hinoki (EW)	2,321.4		175.2	
Hinoki (KD)	14,968.7		480.0	
Hemlock	899.4	0.6%	6,092.2	0.4%
Hemlock (EW)	0.0		0.0	
Hemlock (KD)	6.0		0.0	
European whitewood	82.3	13.9%	8,142.7	12.1%
European whitewood (EW)	20,488.3		190,324.6	
European whitewood (KD)	0.0		4,467.8	
European redwood (red pine)	0.0	1.9%	883.2	5.7%
European redwood (EW)	2,864.1		93,913.3	
European redwood (KD)	0.0		0.0	
Spruce	384.0	0.6%	4,600.3	0.5%
Spruce(EW)	564.0		1,872.0	
Spruce(KD)	0.0		1,785.6	
DF	1,670.4	20.8%	649,427.9	76.3%
DF(EW)	28,766.0		132,437.6	
DF(KD)	394.3		496,158.4	
AYC	188.6	0.9%	0.0	0.0%
AYC(EW)	1,028.6		0.0	
AYC(KD)	157.4		0.0	
Engineered wood	5,012.0	3.4%	8,552.6	0.5%
Matsu (pine)	135.4	3.9%	10,900.8	1.8%
Matsu Pine (EW)	5,702.1		10,750.2	
Matsu Pine (KD)	0.0		8,033.3	
Radiata pine	0.0	0.1%	2,304.0	0.1%
Radiata pine (EW)	90.0		0.0	
Radiata pine (KD)	0.0		0.0	
Total	**148,113**		**1,674,246**	

Source: Japan Pre-cutters Association 2003
Data Analysis: CINTRAFOR 2003
Translation: CINTRAFOR 2003

Construction details and lumber volume used in 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 5.4. In addition, the approximate volume of lumber used in each end-use application is also provided. Note that the lumber volumes estimates are for a typical 30 tsubo post & beam house (which translates into 1,066 square feet).

The typical Japanese post & beam house is built on short concrete foundation walls over a concrete slab, Figure 5.1. The ground sill (*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.

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* extend up from the floor and are located between the *toshibashira* and are used to frame each floor of the house. Non-structural studs (*mabashira*) are placed between the structural posts and are used primarily for attaching the sheetrock and exterior sheathing onto the walls. Finally, diagonal bracing (*sujikai*) is 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 (although this is beginning to change), shear strength for the wall system is derived from both the diagonal bracing members (*sujikai*) 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 members are used to frame in the second floor of a post and beam house, although the height of the second story walls is generally shorter than those on the first floor.

The roof systems for most post and beams houses utilizes 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 the top plate is used as a point of attachment for the rafters (*tarouki*). 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 that 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 5.4: 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
Tarouki	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
*	Primary lumber length used.*

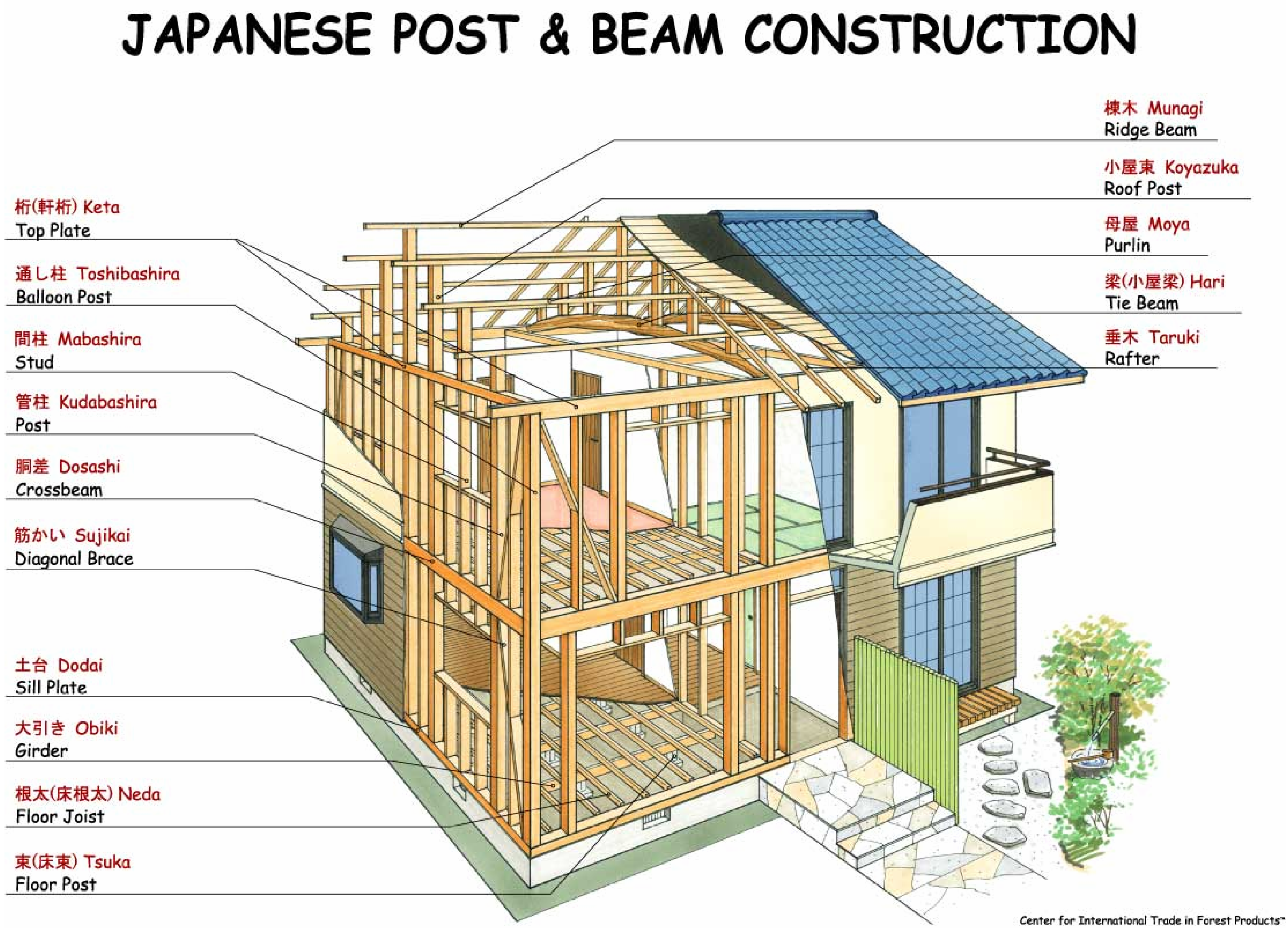

Figure 5.1. Structural components of the Japanese post and beam house.

Estimating potential demand for structural lumber in the post and beam industry

Information derived from a survey of the Japanese pre-cut industry, residential construction statistics, and interviews with housing industry experts and Japanese home builders provided the basis for estimating the volume of structural lumber used in the Japanese post and beam industry annually, Table 5.5. The volume estimates presented in Table 5.5 are based on the 450,000 post and beam housing starts recorded in 2005.

The total volume of structural lumber used in post and beam houses in 2005 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 5.5. 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 5.5: Estimates of total structural lumber use in post and beam construction.

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 m3***
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 m3***
Hirakaku	Structural beam	5.0 m^3	2,250,000 m^3
Sub-Total	***Structural Beams***		***2,250,000 m3***
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
Tarouki	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

6.0 Japanese Softwood Lumber Industry

The lumber industry in Japan has traditionally been characterized by small-scale “mom and pop” sawmills operating within very localized, rural markets. These mills typically process locally harvested logs into lumber for use by local home builders. Most of their lumber is sold to local wholesalers who perform many of the marketing functions for the sawmill. As a result, many small sawmills have a poor understanding of the markets and demand for their products. Increasing competition from imported lumber has contributed to the problems confronting local sawmills, as has the closure of a large number of small rural sawmills over the past twenty years, due to the combination of outdated sawmill technology and high stumpage prices for domestic logs. These small rural sawmills were often family run and the continued movement of population from the rural areas to the big cities has left many of these small sawmills to close when the owner retires.

Large sawmills located in the industrial zones of large port cities have to a large extent replaced small rural sawmills. These larger sawmills often process a combination of imported logs and domestic logs, although some of the largest sawmills process imported logs exclusively. These mills are larger, more efficient, with more modern equipment and better access to capital than the small local mills. However, these mills are also confronted with the rising cost of production that have plagued the small rural mills and they often find themselves at a competitive disadvantage to foreign lumber producers.

Softwood Lumber Industry Demographics

Number of sawmills, by region

The number of sawmills in Japan has been declining steadily since 1963, while lumber production has been declining since 1973 (Figure 6.1). The number of sawmills in Japan, which totaled 25,295 in 1963, fell to just 8,590 in 2006. As a consequence, lumber production has declined from a high of 45.3 million m^3 in 1973 to 12.7 million m^3 in 2006. It is interesting to note that while the number of sawmills have declined by 64.2% since 1973, the decline in lumber production over the same time period has been a much higher 71.9%. Clearly, mills closures have not been limited to just the small, rural “mom and pop” sawmills.

Number of sawmill workers, by region

The number of sawmills in 2004 totaled 9,420, a decline of 32.8% from 1996. Meanwhile, the number of employees in the sawmill industry fell to 58,593, a decline of 44.1% (Table 6.1). Similarly, lumber production declined 43.8% from 1996 to 2004. Although the greatest percentage of sawmill closures occurred on the island of Hokkaido, the data presented in Table 6.1 shows that substantial numbers of mill closures occurred across every region of Japan. The decline in regional lumber production ranged from a 21.8% decline in the Chugoku region to a 52.8% decline in the Kinki region, Figure 6.2. However, it should be noted that not all of the drop in lumber production is attributed to mill closures. Rather, some of the drop in production can be attributed to curtailed production levels due to reduced demand in the housing sector as a result of the prolonged economic slump in Japan.

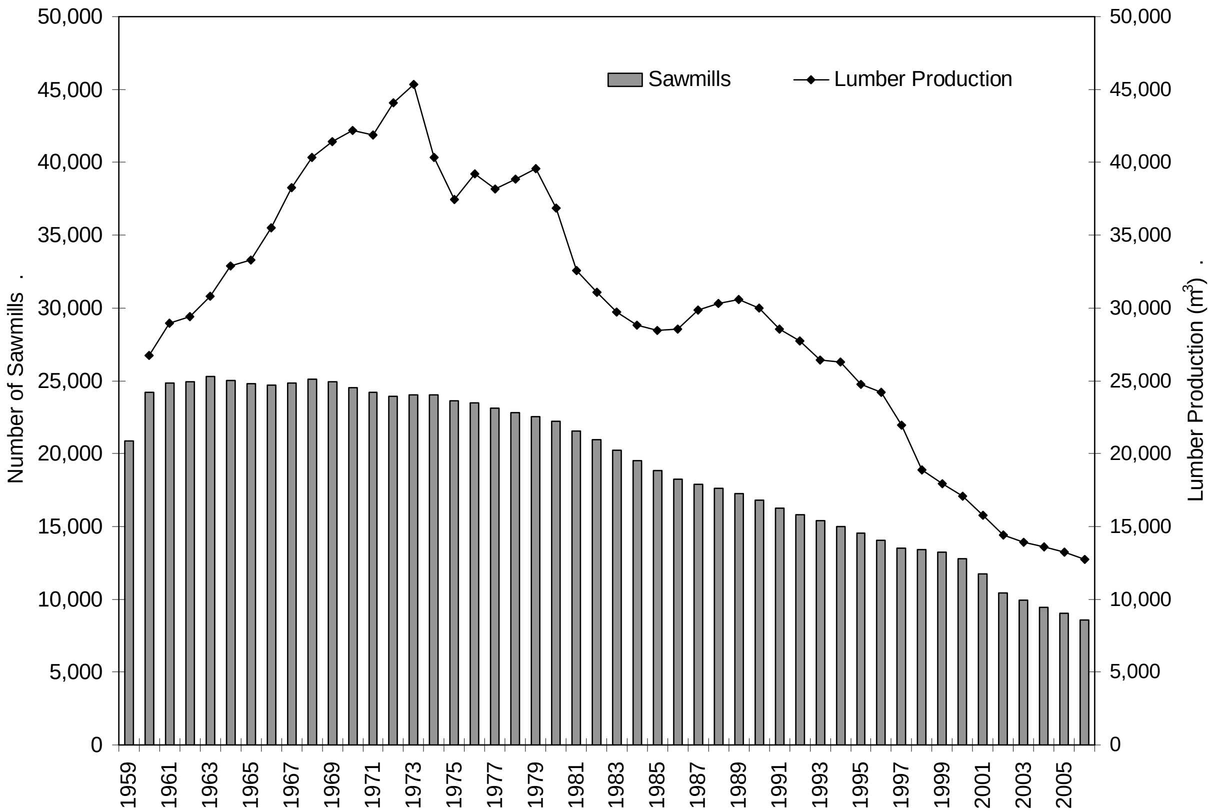

Figure 6.1: Number of sawmills and lumber production in Japan, 1959-2006.

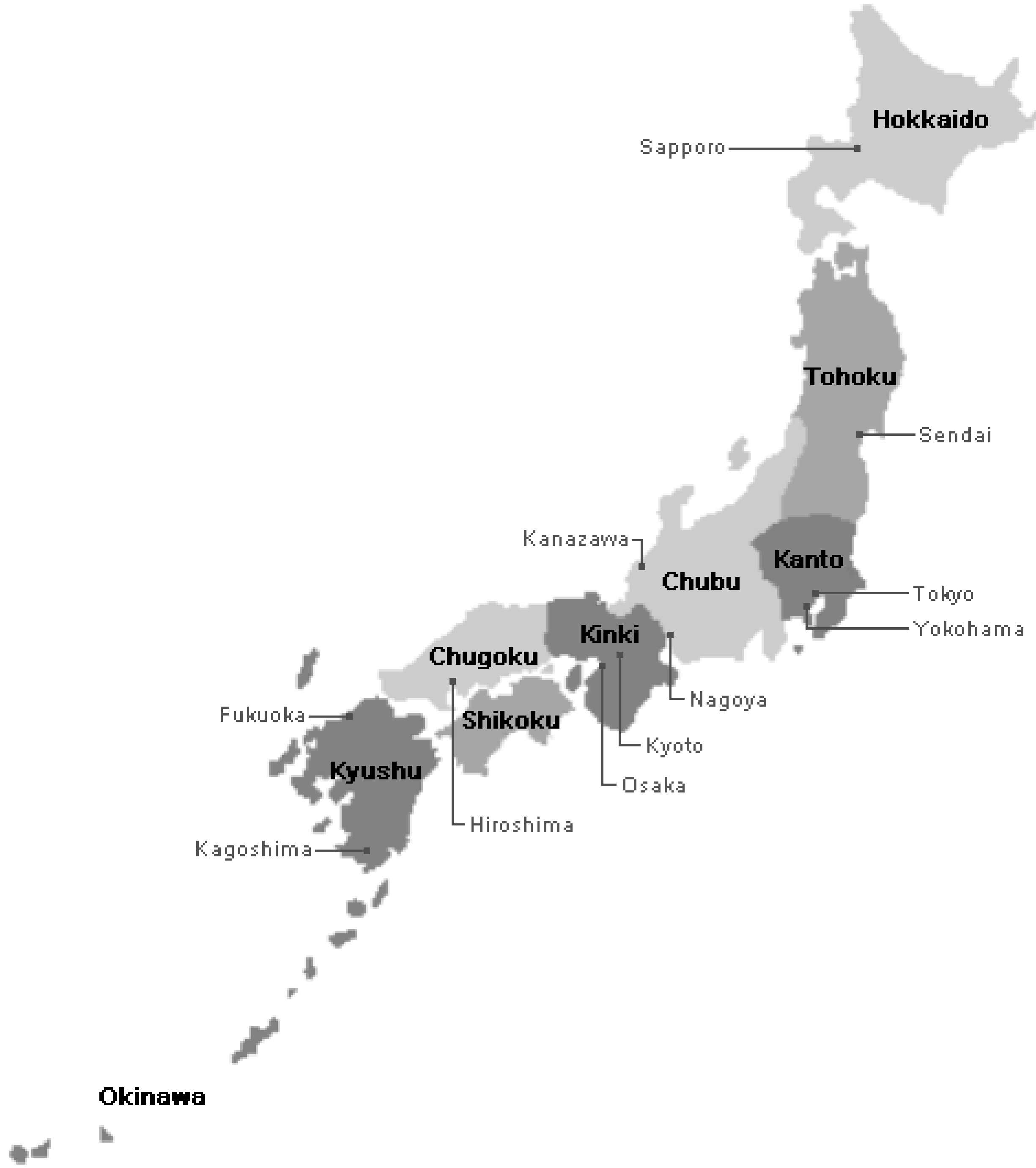

Figure 6.2: Regional map of Japan.

(Source: http://www.japan-guide.com/list/e1001.html)

Table 6.1: Number of sawmills, employees, and lumber production (m3) in Japan, by region.

Region	1996			1999			2003		
	Sawmills	Employees	Production	Sawmills	Employees	Production	Sawmills	Employees	Production
Total	13,990	99,464	24,206,000	12,247	78,757	18,165,000	9,875	58,593	13,929,000
Hokkaido	482	7,149	2,115,000	388	5,346	1,615,000	290	3,899	1,288,000
Tohoku	2,014	15,467	3,778,000	1,776	12,093	2,757,000	1,441	8,435	1,944,000
Kanto	1,694	8,929	1,552,000	1,464	7,125	1,130,000	1,174	5,632	845,000
Chubu	3,784	22,779	4,773,000	3,294	17,987	3,466,000	2,657	13,113	2,457,000
Kinki	2,234	14,167	3,075,000	2,006	11,408	2,102,000	1,601	8,226	1,451,000
Chugoku	1,044	8,831	2,894,000	910	7,077	2,402,000	742	5,869	2,263,000
Shikoku	827	7,139	2,481,000	713	5,670	1,829,000	607	4,314	1,334,000
Kyusu-Okinawa	1,911	15,003	3,538,000	1,696	12,051	2,864,000	1,134	9,105	2,347,000

Table 6.2: Productivity of Japanese sawmills between 1996 and 2003.

Region	Production per Sawmill (m3)			Production per Employee (m3)		
	1996	1999	2003	1996	1999	2003
Total	1,730	1,483	1,411	243	231	238
Hokkaido	4,388	4,162	4,441	296	302	330
Tohoku	1,876	1,552	1,349	244	228	230
Kanto	916	772	720	174	159	150
Chubu	1,261	1,052	925	210	193	187
Kinki	1,376	1,048	906	217	184	176
Chugoku	2,772	2,640	3,050	328	339	386
Shikoku	3,000	2,565	2,198	348	323	309
Kyusu-Okinawa	1,851	1,689	2,070	236	238	258

Sawmill productivity, by region

Several measures of productivity are provided in Table 6.2, although the reader should keep in mind that these numbers are averages. Given the wide variation in sawmill size in Japan and the ongoing economic problems, which have depressed lumber demand, it is perhaps better to focus attention on the lumber production per employee data. Based on this data, it would appear that the more productive sawmills are located on the island of Hokkaido and in the Chugoku and Shikoku regions. In contrast, sawmills with the lowest productivity tend to be located in the Kanto, Kinki and Chubu regions. The data also suggest that the number of workers and the average lumber production of sawmills in every region has declined since 1996. As a result, in many regions, sawmill productivity (measured in terms of lumber production per employee) has also declined although the reverse is true for Hokkaido and Chugoku.

Number of sawmills and production, by log source

As described previously, many sawmills in Japan utilize a combination of domestic and imported logs in their raw material mix (Tables 6.3 and 6.4). In 2003, 4,995 sawmills (50.7% of total sawmills) processed only domestic logs while an additional 1,843 sawmills (18.7%) relied on domestic logs for more than 50% of their raw material inputs. In contrast, 1,208 sawmills (12.3% of the total) processed only imported logs while an additional 1,804 sawmills (18.3% of total) processed primarily imported logs. This suggests that a majority of the sawmills in Japan (69.4%) are primarily or exclusively processing domestic logs.

However, when considering the volume of log inputs that are processed within each category of sawmill, a different story emerges. The total volume of logs processed by mills utilizing only domestic logs was 8.81 million m^3, corresponding to an average annual processing capacity of 1,764 m^3 for this type of sawmill. In contrast, the total log inputs for mills processing only imported logs was 8,077,000 million m^3, corresponding to an average annual processing capacity of 6,686 m^3 for these sawmills. This suggests that the average imported sawmill is more than three times as big as the average domestic sawmill. In between these extremes are the mills that process primarily domestic logs (and some imported logs) and those that primarily process imported logs (and some domestic logs). The average annual processing capacity for these mills is 1,496 m^3 and 1,494 m^3, respectively, less than that of the domestic mills and suggesting that processing efficiency may increase when a mill specializes in a particular type of log.

Table 6.3: Summary of softwood sawmills in Japan, by region, 2003

Region	Domestic Sawmills	Imported Sawmills	Domestic Lumber Production	Imported Lumber Production	Production/Mill (Domestic Logs)	Production/Mill (Imported Logs)	Domestic to Imported ratio
Total	8,641	4,817	7,176,000	6,753,000	830	1,402	59.24%
Hokkaido	260	163	945,000	343,000	3,635	2,104	172.72%
Tohoku	1,349	709	1,203,000	741,000	892	1,045	85.33%
Kanto	1,025	411	581,000	264,000	567	642	88.25%
Chubu	2,216	1,774	742,000	1,715,000	335	967	34.64%
Kinki	1,361	821	663,000	788,000	487	960	50.75%
Chugoku	669	386	487,000	1,776,000	728	4,601	15.82%
Shikoku	485	247	599,000	735,000	1,235	2,976	41.50%
Kyusu-Okinawa	1,276	306	1,956,000	391,000	1,533	1,278	119.97%

Table 6.4: Log input volumes for sawmills in Japan, by region and log type (1996 vs 1999 vs 2003).

Region	1996 Log Sources (1,000 m3)				1999 Log Sources (1,000 m3)				2003 Log Sources (1,000 m3)			
	Total	Domestic	Imported	US	Total	Domestic	Imported	US	Total	Domestic	Imported	US
Total	35,545	16,154	19,391	12,799	27,449	13,246	14,203	8,458	21,857	11,214	10,643	6,087
Hokkaido	3,713	2,526	1,187	577	2,952	2,068	884	262	2,471	1,880	591	171
Tohoku	5,615	3,062	2,553	1,625	4,224	2,445	1,779	890	3,017	1,939	1,078	418
Kanto	2,166	1,223	943	740	1,591	978	613	447	1,234	858	376	260
Chubu	6,984	1,726	5,258	2,630	5,267	1,366	3,901	1,649	3,761	1,110	2,651	887
Kinki	4,420	1,647	2,773	2,111	3,097	1,331	1,766	1,263	2,184	961	1,223	690
Chugoku	4,337	1,102	3,235	2,666	3,677	897	2,780	2,296	3,795	751	3,044	2,545
Shikoku	3,369	1,308	2,061	1,460	2,550	1,050	1,500	1,043	2,008	901	1,107	724
Kyusu-Okinawa	4,941	3,560	1,381	990	4,091	3,111	980	608	3,432	2,814	618	392

Table 6.5: Ratio of specific log imports to total log imports.

Region	1996			1999			2003		
	Domestic Ratio	Imported Ratio	US Share of Imports	Domestic Ratio	Imported Ratio	US Share of Imports	Domestic Ratio	Imported Ratio	US Share of Imports
Total	0.45	0.55	0.66	0.48	0.52	0.60	0.51	0.49	0.57
Hokkaido	0.68	0.32	0.49	0.70	0.30	0.30	0.76	0.24	0.29
Tohoku	0.57	0.43	0.67	0.59	0.41	0.57	0.64	0.36	0.39
Kanto	0.49	0.51	0.80	0.52	0.48	0.76	0.70	0.30	0.69
Chubu	0.26	0.74	0.57	0.29	0.71	0.54	0.30	0.70	0.33
Kinki	0.32	0.68	0.71	0.37	0.63	0.68	0.45	0.57	0.56
Chugoku	0.40	0.60	0.75	0.42	0.58	0.74	0.20	0.80	0.84
Shikoku	0.32	0.68	0.66	0.34	0.66	0.64	0.45	0.55	0.65
Kyusu-Okinawa	0.61	0.39	0.64	0.65	0.35	0.52	0.82	0.18	0.63

Table 6.6: Number of sawmills in Japan, by number of employees and region, 2003.

Region	Sawmills	<4	5-9	10-19	20-29	30-49	50+
Total	9,875	5,871	2,553	1,063	252	99	37
Hokkaido	290	41	85	117	30	13	4
Tohoku	1,441	855	370	157	41	12	6
Kanto	1,174	824	252	77	13	4	4
Chubu	2,657	1,723	652	226	36	13	7
Kinki	1,601	999	119	124	32	17	2
Chugoku	742	401	208	91	23	13	6
Shikoku	607	301	176	94	23	10	3
Kyusu-Okinawa	1,134	727	383	177	54	17	5

Sawmills processing imported logs tend to have a higher level of average lumber production, as the log input data suggests (Tables 6.3 and 6.4). In 2003, the average annual lumber production for mills that process domestic logs was 830 m^3, yet it was 1,402 m^3 for mills that process imported logs. This is hardly surprising, given the fact that imported sawlogs, in general, have a larger diameter and are higher quality than domestic sawlogs. As a result, we would expect that sawmills processing imported sawlogs would be more efficient with a higher level of productivity. The highest share of imported logs are found in Chubu and Chugoku regions and the share of US logs in the imported log mix exceeds 50% in every region except Hokkaido, Tohoku and Chubu (Table 6.5).

Number of sawmills, by size

As discussed earlier, many of the sawmills in Japan are extremely small and inefficient "mom-and-pop" type operations. The data presented in Table 6.6 supports this observation. Fully 59.5% of the sawmills employ four or less workers while an additional 25.9% employ between 5 and 9 workers. In contrast, less than 4% of all sawmills in Japan employ twenty or more workers. Clearly the sawmill industry in Japan continues to be characterized by the small "mom-and-pop" sawmills located primarily in rural areas and processing domestic *sugi* and *hinoki* logs for use by local builders in local markets.

Summary of Trends in the Domestic Sawmill Industry

There are a variety of factors that have adversely affected Japan's domestic lumber industry. These factors include the structure of the industry itself, including rising production costs and the small, regional structure of the sawmills, regulatory reform within the residential construction industry that has affected the demand for lumber produced from domestic species like *sugi*, and increased imports of low cost, high quality lumber.

The structure of the domestic sawmill industry and its impact on competitiveness has been discussed previously. While many of the regulatory reforms within the residential construction industry were discussed earlier, other regulatory reforms impact the industry as well. For example, in May 2001 the Government Housing Loan Corporation revised their conditions for receiving a home mortgage to require the use of treated lumber for ground sills in all new housing. This means that all new housing purchased using a GHLC mortgage must utilize treated lumber in ground sill applications that meets or exceeds the JAS K3 criteria. Previously ground sills were only required to meet the JAS K2 criteria. This regulatory change was adopted to meet the new ten-year housing warranty requirement contained within the Housing Quality Assurance Act (HQAA) adopted last year. The new requirement will likely exclude the use of a domestic species such as larch, which is difficult to treat with preservatives, in ground sill applications. Until now, larch ground sills had been used extensively in the central interior districts of Japan.

It is also generally accepted that the housing construction industry will continue to increase its use of kiln-dried lumber to meet the ten-year warranty criteria specified by the HQAA. But while demand is expected to continue rising, a recent survey of the sawmill industry by the Forestry Agency found that in 2003 only 1,492 sawmills (15.1% of total) had dry kilns. The volume of kiln-dried lumber produced domestically increased to 2.34 million m^3, a 13% increase from 2002. The volume of kiln-dried lumber produced in 2003 represents 16.8% of total lumber production in Japan. However, the 2.34 million m^3 of kiln dried lumber produced in 2003 was just one-third of the installed KD capacity for the industry.

Finally, foreign companies have increased their lumber exports to Japan. Often this foreign lumber is lower priced and higher quality than domestically produced lumber and local manufacturers find themselves at a competitive disadvantage in many of the larger urban markets. While the competition is somewhat less in local, rural markets, many foreign companies are actively looking to expand their sales into these markets. There is little doubt that competition within the Japanese lumber market will continue to increase. The increasingly competitive business environment will force more consolidation and closures within Japan's sawmill industry, particularly within the small 'mom-and-pop' segment of the industry. Thus, in order to remain viable, domestic lumber manufacturers must develop a strategy that will allow them to compete within the new business environment.

It should be noted that in 2004 a new association was formed to promote the use of domestically produced timber, particularly sugi and hinoki, within the Japanese market. This association, (named the Domestic Wood Lumber Association), was also tasked with developing exports markets for sugi logs, particularly in China (JLR 2005). The initial membership of this association was 27 companies. In response, log exports from Japan to China, while still small, jumped from 7,000 m^3 in 2003 to 30,000 m^3 in 2006. The formation of this association in a sense recognizes the fact that many prefectures and local governments currently offer subsidies to those wooden home builders who utilize a specific amount of domestic timber in the homes they build. By mid-2004, it was reported that there were 66 local governments providing some type of subsidy program for the use of domestic timber in wooden houses (JLJ 2004). In addition, in 2006 the Forestry Agency introduced a program euphemistically called the "New Production System" that is aimed at increasing the demand for domestic lumber through a program of subsidies targeted at streamlining the lumber distribution system and increasing the competitiveness of lumber manufacturers (JLJ 2006). The goals of the program include: 1) improve the efficiency of the lumber distribution system, 2) encourage consolidation and the formation of lumber processing cooperatives, 3) improve the supply of timber to domestic processors and 4) support the profitability of forest owners practicing sustainable forest management.

7.0 The Japanese DF Sawmill Industry and the Role of Branding

> *Given the history of superior performance and its stellar reputation as a beam material, Douglas-fir lumber exporters should recognize that they have a real opportunity to develop a viable and valued brand identity for Douglas-fir hirakaku in Japan. Success in developing a Douglas-fir brand would allow U.S. exporters to shift the basis of competition away from low price to a combination of price and performance. In other words, the Douglas fir branded hirakaku would be marketed on the concept of value (the ratio of performance per unit price) rather than simply low price. The challenge is to develop a branding strategy that would allow the U.S. industry to communicate the value of Douglas fir hirakaku to Japanese homebuilders and pre-cutters. Equally important, the branding program would show Japanese homebuilders and pre-cutters how they could communicate the benefits of using Douglas-fir hirakaku to their customers, the homebuyer. More importantly, it would help home builders and pre-cutters show how the slight increase in price is offset by a large increase in structural performance and long-term durability of the home (assuming that these product attributes are important to builders and home buyers).*
>
> ***Excerpt from: "Opportunities for US Wood Product Exports to Japan" by R. E. Taylor and Associates LTD. 2003. (page 60)***

The preceding quote represents one of the strategic recommendations from a report commissioned by the American Forest and Paper Association to identify potential market opportunities for US structural wood products in Japan. On the basis of this recommendation, a project was funded to investigate the opportunity for US firms to develop and market branded Douglas-fir hirakaku (beams) in Japan. To assess the opportunity, an investigation of the domestic DF sawmill industry in Japan was conducted that explored the use of branding in domestically produced and marketed DF hirakaku.

The domestic Douglas-fir sawmill industry

The import statistics presented in Figure 3.4 show that while Japanese imports of DF logs have declined by more than half since 1989, they remain at almost 3 million m^3. These log exports provide the raw material for a small group of sawmills in Japan that often exclusively process imported Douglas-fir logs. A summary of the characteristics of the main DF sawmills in Japan is provided in Table 7.1. The reported log inputs for these 13 sawmills accounted for 93.7% of the total DF log imports into Japan in 2004. The mills in italics represent sawmills that the study team visited during the course of this project. The visited sawmills processed 85.5% of the DF logs imported into Japan in 2004 and produced 88.9% of the DF lumber manufactured in Japan. Thus we can conclude that the information derived from the interviews provides a representative picture of the DF sawmill industry in Japan.

The arrival of DF log imports is primarily through the Inland Sea which is surrounded by the regions of Chugoku and Shikoku (Table 7.2 and Figure 7.1). The two major ports through which DF logs are shipped are Kure (with 43% of total DF log imports in 2004) and Matsunaga (with an additional 17% of total DF log imports). The import data shows that the vast majority of DF log imports are shipped into the regions of Chugoku and Shikoku.

The Japanese DF sawmill industry is dominated by a single company, Chugoku Mokuzai, which represented almost two-thirds (63.4%) of the DF lumber production in Japan in 2004. All of the mills visited reported producing a range of lumber product targeted exclusively to the post and beam construction industry. Hirakaku were the primary products being produced by all companies interviewed while other major products included posts (both kudabashira (single story posts) and toshibashira (two story balloon posts)), mabashira (non-structural wall studs), sujikai (diagonal wall bracing), dodai, (ground sill plates), neda (floor joists) and taruki (roof rafter components), among others. An analysis of the product mix of the surveyed companies shows that hirakaku products represent between one-half to two-thirds of total lumber production with posts representing another 10-20%.

Table 7.1: Summary of major sawmill processing Douglas-fir logs in Japan, 2004.

Company	Log Consumption (m3)	Species	KD (%)	Lumber Production (m3)	Hirakaku Brand Name
Chugoku Lumber Co., Ltd.	1,784,000	100% DF	42.6%	1,125,564	Dry Beam
Toa Ringyo Co., Ltd.	216,000	100% DF	25.6%	140,400	Natural Dry
Maruho Co., Ltd.	192,000	100% DF	7.5%	120,000	Mild Dry
Tsurui Sangyo Co., Ltd.	180,000	100% DF	21.5%	111,600	Super KD Beam
Okamoto Lumber Co., Ltd.	78,000	100% DF	0%	50,000	
Tachikawa FP Ltd.	96,000	100% DF	18.2%	48,000	Eco Beam
Mukai Lumber Co., Ltd.	60,000	100% DF	5%	38,000	
Nanbu Lumber Co., Ltd.	42,000	100% DF	5%	25,000	
Sekiguchi Seizai Co., Ltd.	39,000	100% DF	0%	25,000	
Takeno Mokuzai.	36,000	100% DF	12%	23,000	Super Beam
Sugawa Yoko Corp.	36,000	100% DF	0%	23,000	
Homec	30,000	100% DF	15%	20,000	
Kitahama Corp	30,000	100% DF	20%	20,000	
Total	**2,819,000**			**1,769,564**	

Table 7.2: Japanese imports of Douglas-fir logs, by port of arrival (2004).

Port	Volume (m^3)	Share (%)
Kure	1,263,150	43.1
Matsunaga	505,256	17.3
Matsuyama	164,553	5.6
Iwakuni	130,995	4.5
Komatsushima	127,072	4.4
Hanna	74,903	2.6
Takamatsu	52,239	1.8
Nagoya	51,688	1.8
Sodegaura	51,674	1.8
Gamagori	45,787	1.6
Others	461,546	15.5
Total	**2,928,863**	

Source: Japan Lumber Reports No. 432

Despite increased demand for kiln dried lumber, the majority of lumber produced by the DF sawmills is green. Sawmills interviewed reported that their kiln drying capacity ranged from zero to 42.6% of total lumber production (Table 7.1). On average, the survey data indicates that approximately 30% (510,000 m^3) of the DF hirakaku produced in Japan is kiln dried. In addition, a sizable volume of DF hirakaku is dried using a combination of kiln drying followed by air drying or by air drying alone. Our estimates suggest that approximately 4-5% of DF hirakaku production (80,000 m^3) receives this milder drying regime.

Half of the DF sawmill companies visited also have precut facilities. This vertical integration from lumber production to precutting provides them with a low cost source of raw material for their precutting facilities. For these sawmills, sales to their pre-cut division accounted for approximately half of their lumber production in 2004. There appears to be a strong correlation between vertical integration into precutting and the decision to import lumber products. Firms that were not vertically integrated into precutting imported virtually no lumber products whereas those that had integrated into precutting operations reported imported a wide variety of lumber products including European redwood and whitewood posts, European redwood hirakaku (small sizes), treated hemlock dodai, treated DF dodai and Russian red pine taruki.

Distribution channels for DF hirakaku products tend to be fairly similar across the range of DF sawmills interviewed. In general, DF hirakaku products were distributed into four basic channels: home builders, wholesale distributors, pre-cut manufacturers and retailers. Sawmill managers indicated that their most important distribution channel was to precut manufacturers, followed by wholesale distributors, retailers and home builders. Analyzing the survey data on a volume basis across all survey respondents suggests that approximately 48.7% of DF hirakaku are distributed to precut manufacturers, 28.2% are distributed through wholesalers, 18% are distributed to retailers and just 5.1% are sold directly to homebuilders. Sales to retailers appears to be restricted because of the 2 meter length requirements of DIY retailers whereas most mills are producing hirakaku in minimum lengths of 3 and 4 meters.

Given the dominance of Chugoku Mokuzai in this industry segment, it is no surprise that smaller sawmills have adopted a variety of marketing strategies that allow them to target smaller niche markets to

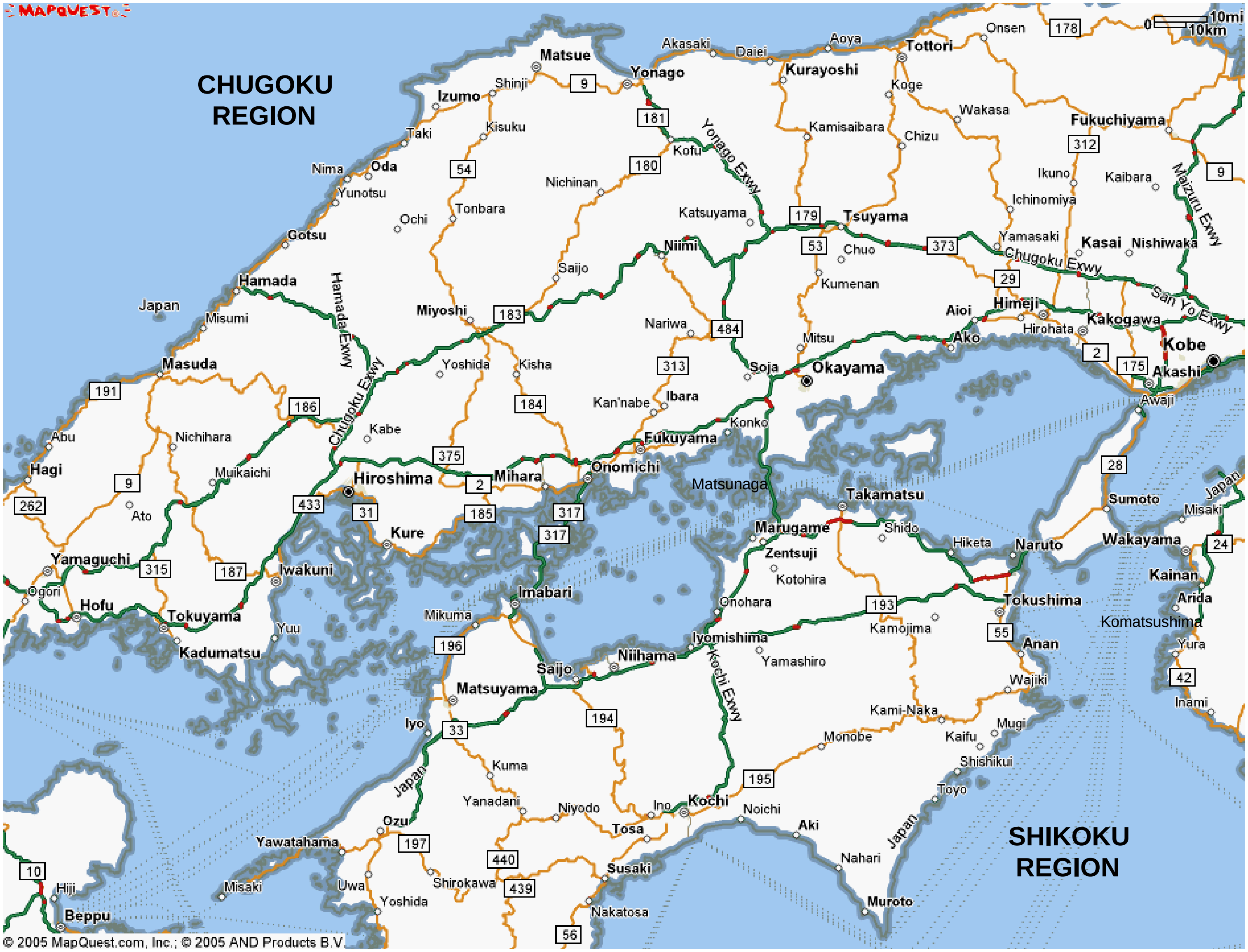

Figure 7.1: Map of major ports for Douglas-fir log imports from the US.

Source: Mapquest

avoid direct competition with the industry leader. For several sawmills this entailed vertical integration into precut manufacturing. Others tend to focus on producing high quality custom products by importing high quality DF logs and employing milder drying conditions (either air drying or a combination of air drying and kiln drying) to reduce the discoloration of the final product. Several small sawmills provide products on a just-in-time basis that allows them to reduce their inventory requirements. However, the sheer dominance of Chugoku Mokuzai in this market restricts the ability of smaller firms to command a price premium for their products given the ready availability of substitute DF products as well as imported glulam products (in the case of smaller hirakaku sizes).

One of the objectives of this project was to evaluate the role of branding in the marketing of DF hirakaku in Japan. Prior to visiting the DF sawmills, we were aware that Chugoku Mokuzai was using a branding strategy for their kiln dried hirakaku. These kiln dried hirakaku are marketed under the Dry Beam brand name. Chugoku Mokuzai recognized the shift in the market towards kiln dried hirakaku well before the Kobe earthquake and began producing kiln dried hirakaku in 1989. They introduced their Dry Beam brand in the mid 1990's and currently produce approximately 450,000 m^3 of kiln dried hirakaku annually. According to the company president, their market share for kiln dried hirakaku is approximately 90%. Interestingly, the Dry Beam hirakaku is actually two distinct product lines. The first Dry Beam product, which represents about 70% of total Dry Beam production, is a JAS stamped product which has a bending strength rating of E110 or higher. The second Dry Beam product does not have a JAS grade stamp, despite the fact that approximately half of the hirakaku in this product line have a bending strength that exceeds the E110 threshold required for JAS stamp approval while the remainder have a bending strength below E110. This mix of products is done to improve the quality of the unstamped hirakaku. In addition they have also begun marketing a branded DF glulam hirakaku called Lamina Beam which has a market share of less than 5% currently.

Our visits to the other DF sawmills found that all of the sawmills have developed a DF hirakaku branding strategy. A summary of the hirakaku brand names for the companies visited is provided in Table 7.1. Figures 7.2 through 7.6 show the promotional material for the branded hirakaku while Figures 7.7 through 7.12 shows photos of the branded hirakaku products manufactured by each of the sawmills visited. While two of the companies (Tachikawa and Tsurui Sangyo) had not produced brochures to assist in the marketing of their branded hirakaku, all of the companies marked their hirakaku with the brand name, both on the lumber and on the lumber wrap.

During our discussions with the presidents of each sawmill, it became readily apparent that none of the sawmills (with the exception of Chugoku Mokuzai) were actively promoting their branded hirakaku in the marketplace. The rationale behind this was that while providing a branded product was a market requirement, the strong demand for kiln dried hirakaku meant that the smaller sawmills were currently selling all of their kiln dried hirakaku production. As a result, they did not see a reason to invest in a promotional strategy since demand currently exceeded production capacity. Most of the sawmills visited indicated that they expected to increase their kiln drying capacity in the near future. The presidents of these sawmills viewed a product brand as an expectation on the part of their customers that helped the sawmill to build brand recognition and develop brand loyalty. However, given the sheer dominance of Chugoku Mokuzai in the hirakaku market, they emphasized that they are not able to charge a premium for their branded products because of the higher production efficiency and lower production costs of Chugoku Mokuzai. Thus they are price takers in the hirakaku market.

Despite the fact that Chugoku Mokuzai has moved into the production of laminated DF hirakaku with their Lamina Beam, there was some ambiguity regarding the competitive impact of glulam hirakaku. While a couple of the sawmill presidents interviewed felt that the market would shift rapidly to glulam hirakaku, the consensus seemed to be that whereas there may be considerable substitution of glulam for

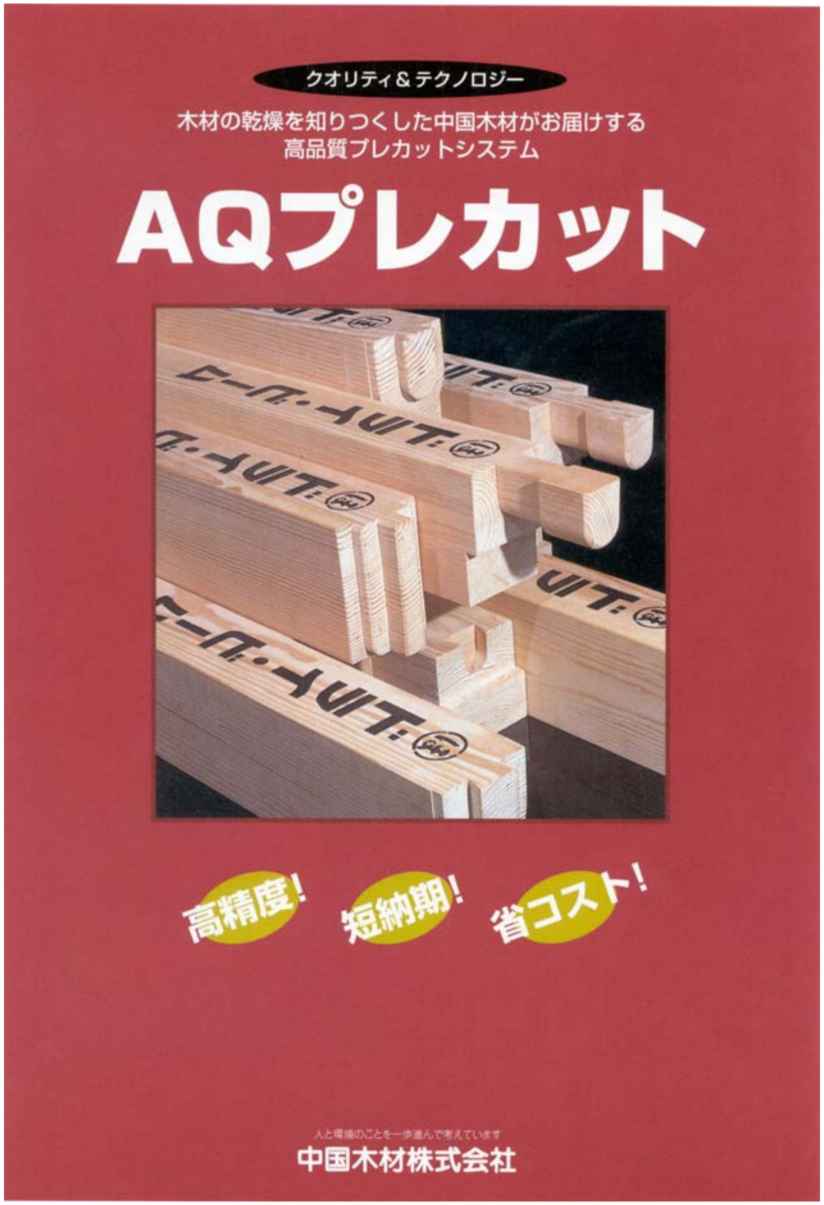

Figure 7.2: Chugoku Mokuzai Dry Beam hirakaku brand.

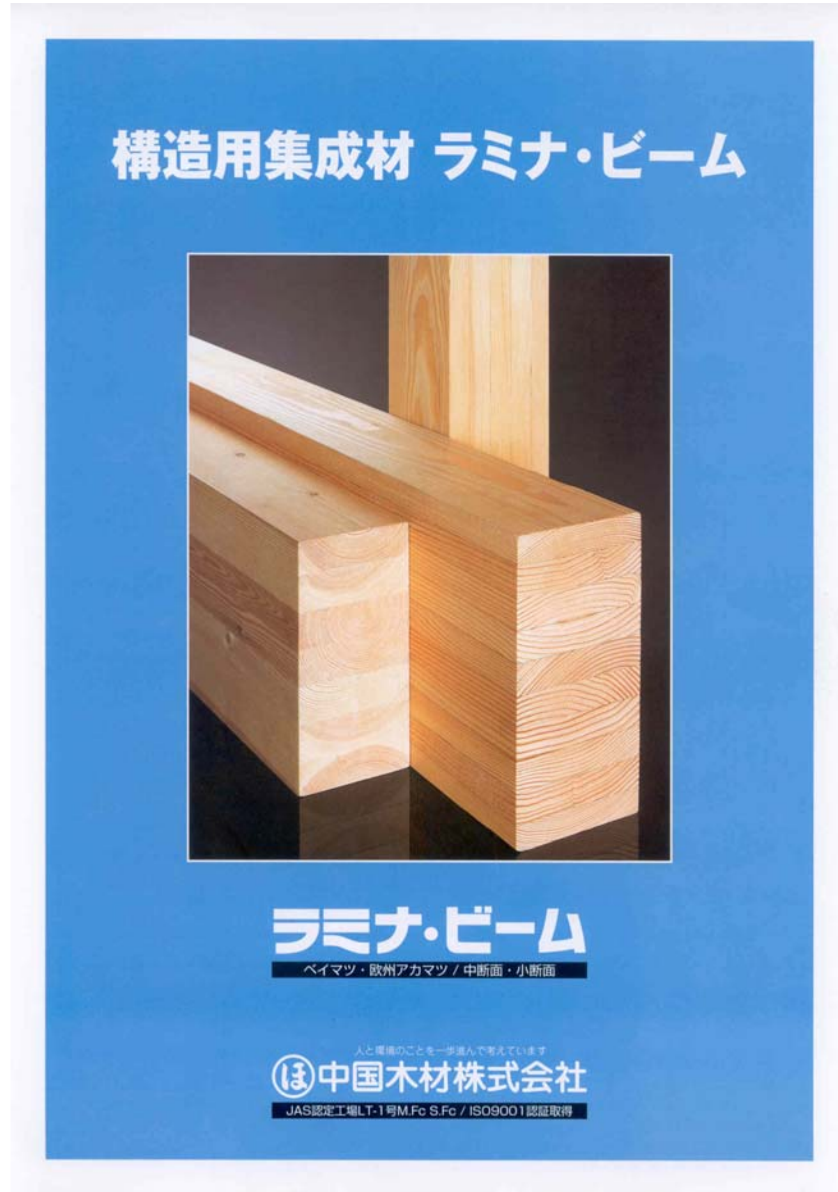

Figure 7.3: Chugoku Mokuzai Lamina Beam hirakaku brand.

Figure 7.4: Takeno Mokuzai Super Beam hirakaku brand.

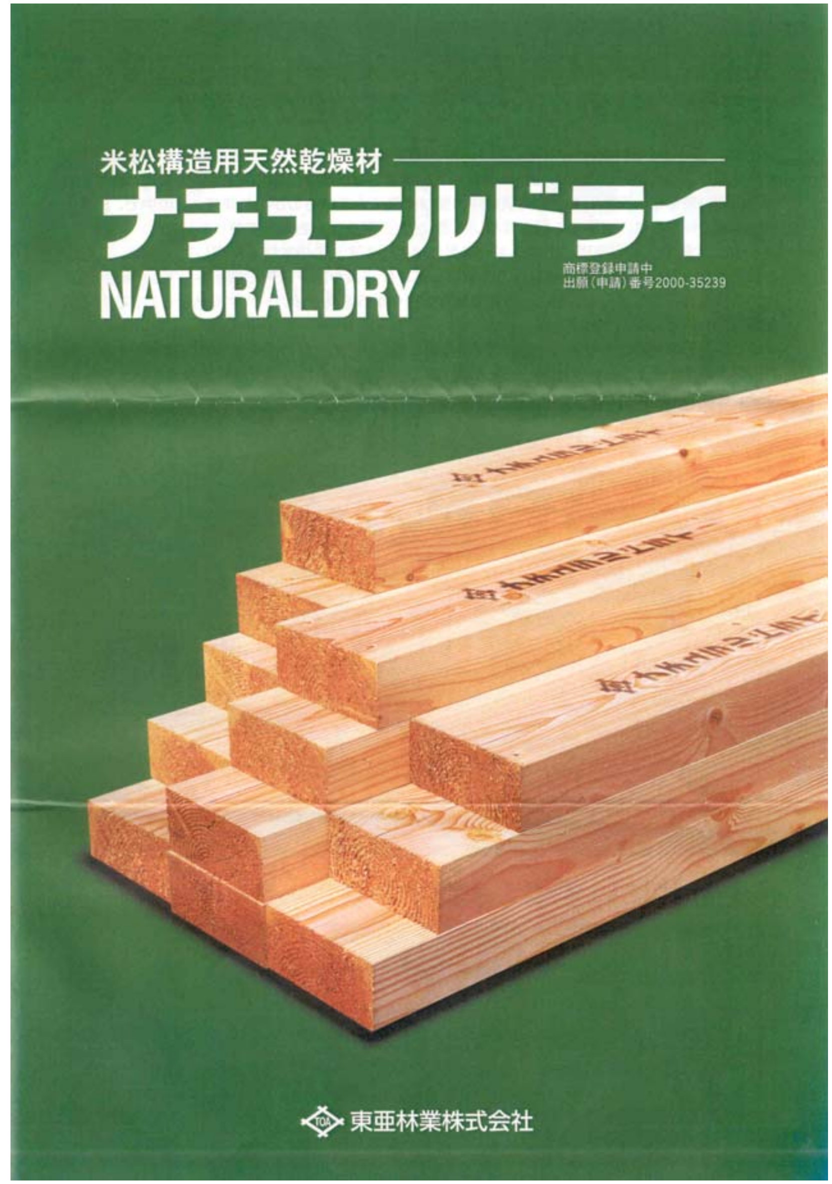

Figure 7.5: Toa Ringyo Co. Natural Dry hirakaku brand.

Figure 7.6: Maruho Co. Mild Dry hirakaku brand.

Figure 6.7: Tsurui Sangyo Super KD Beam

Figure 7.8: Tsurui Sangyo Super KD Beam

Figure 7.9: Chugoku Mokuzai Dry Beam hirakaku.

Figure 7.10: Toa Ringyo Natural Dry hirakaku.

Figure 7.11: Maruho Mild Dry hirakaku.

Figure 7.12: Tachikawa Eco-Beam hirakaku.

solid sawn in the smaller hirakaku cross-sections and shorter lengths, this was unlikely to occur in larger cross-sections and longer lengths where strength and stiffness are critical factors. They also indicated that formaldehyde off-gassing and healthy house concerns were unlikely to affect the demand for glulam hirakaku to any great extent. One note of interest was the fact that Chugoku Mokuzai has recently received JAS grade stamp approval for a hybrid glulam hirakaku product that uses both imported DF lamina and domestically grown sugi lamina. This product, which will be marketed under the brand name of “Hybrid Beam“, is manufactured by positioning the higher strength DF lamina on the outer faces of the beam (where the bending stresses are highest) while the lower strength sugi lamina are placed in the core section of the beam where the bending stresses are much lower. It is uncertain how the market will react to this product or whether the economics can support the marketing of this new product.

8.0 Opportunities for Branding DF Beams (*Hirakaku*) in Japan

The combination of declining housing starts, the reduced volume of hirakaku use per home, an ongoing (albeit slow) transition from solid sawn to glulam hirakaku, and the skewed demographic profile in Japan suggest that the demand for solid sawn DF hirakaku in Japan will continue to decline.

Housing starts have declined from a recent high of 1.64 million in 1996 to 1.28 million in 2006. This is also true for the post & beam segment of the market where housing starts have declined from 641,197 houses in 1993 to 450,050 houses in 2006. Housing starts are projected to dip below 1 million per year within the next few years. Some experts have estimated that housing starts could drop to 750,000 by 2010. In contrast, a recent CINTRAFOR analysis of the stock of substandard housing in Japan projects that housing starts will most likely hover between 1.1 and 1.3 million through 2010.

While housing starts may well remain constant over the near term, there is no doubt that the volume of structural wood used in post and beam homes has been declining over the past 15 years. Industry estimates show that in 1993 approximately 7 m^3 of hirakaku was consumed in the construction of the typical post & beam house. By 2006, the volume of hirakaku use had shrunk to just under 6 m^3 (within a range of 5-7 m^3). In addition, whereas the use of glulam hirakaku was virtually unheard of in 1993, in 2006 it is estimated that approximately 900,000 m^3 of small to medium size glulam hirakaku beams were used. Using the data presented above, the total demand for solid sawn hirakaku is estimated to have declined from 4.5 million m^3 in 1993 to 1.8 million m^3 in 2006, a drop in demand of 59.9%.

The share of glulam lumber within the hirakaku material mix has increased slowly over the past decade, in contrast to the explosive growth of glulam lumber in post (hashira) applications. Between 1993 and 2004, the market share of glulam lumber in hirakaku end-uses has risen from less than 1% to about one-third of total demand. While the demand for glulam hirakaku is expected to continue growing, the rate of growth is expected to be slow. This expectation is based on two assumptions. First, many small, local Japanese homebuilders prefer using green solid sawn hirakaku because of its low cost and because they believe that their customers prefer solid sawn wood for exposed beam applications. Second, concerns about healthy houses could limit the use of glulam hirakaku in exposed interior applications in some market segments.

There are a number of factors that constrain the competitiveness of solid sawn US DF hirakaku in Japan, including: high cost of kiln drying large size DF hirakaku, the difficulty in shipping green hirakaku to Japan without developing surface mold and discoloration, the difficulty in maintaining a stable moisture content for kiln dried DF hirakaku during the shipping period to Japan, price fluctuations, reluctance to cut to the lengths required by pre-cutters, the size of the domestic Japanese DF sawmill industry, the high cost of maintaining inventory in Japan, the ready availability of lower cost hirakaku products from domestic DF sawmills and foreign glulam suppliers (Table 8.1), the extremely large number of hirakaku size combinations (Table 8.2) that require a huge number of different hirakaku product sizes (approximately 140 size combinations) and the attendant high inventory costs, and the difficulty in establishing an effective distribution system in Japan.

However, despite these challenges, a recent CINTRAFOR cost analysis shows that DF, with its premium reputation, can be cost competitive with other hirakaku products (Table 8.3). The preceding cost analysis for hirakaku was performed to assess the cost impact of using the major hirakaku products. The hirakaku size specifications and the selling price for the home were obtained from a post and beam home builder located in Sendai, north of Tokyo. The material specifications for the hirakaku used in this 1,600 square foot, 2-story house, are listed in the first five columns of Table 8.3. The material specification list shows that, while a large number of hirakaku sizes were specified for this house, just four hirakaku sizes

Table 8.1: Relationship between width and length and price for hirakaku in Japan.

Width (mm)	Lumber Length	
	≤ 4 meters	**5-6 meters**
120 ∫ 270	Green Douglas-fir: ¥38,000 KD Douglas-fir: ¥53,000 Douglas-fir glulam: ¥75,000 European redwood glulam: ¥56,000 European whitewood glulam: ¥55,000	Green Douglas-fir: ¥43,000 KD Douglas-fir: ¥58,000 Douglas-fir glulam: ¥75,000 European redwood glulam: ¥56,000 European whitewood glulam: ¥55,000
> 270	Green Douglas-fir: ¥40,000 KD Douglas-fir: ¥55,000 Douglas-fir glulam: ¥75,000 European redwood glulam: ¥56,000 European whitewood glulam: ¥55,000	Green Douglas-fir: ¥45,000 KD Douglas-fir: ¥60,000 Douglas-fir glulam: ¥75,000 European redwood glulam: ¥56,000 European whitewood glulam: ¥55,000

Prices based on November, 2006 market data *(Source: Sojitz Corporation internal market prices).*

Table 8.2: Range of hirakaku sizes used in post and beam construction in Japan.

Depth (mm)	Width (mm)	Length (m)						
		3	**3.65**	**4**	**4.9**	**5**	**5.5**	**6**
105 mm and 120mm	105							
	120							
	150							
	180							
	210							
	240							
	270							
	300							
	330							
	360							

Table 8.3: Cost analysis for hirakaku in Japanese post and beam construction.

Size (mm)	Length (m)	Unit Volume (m3)	Pieces	Volume (m3)	Unit Cost (Yen/m3)					Total Cost (Yen)				
					DF-EW	*DF-KD*	*DF-Gr*	*Eur WW*	*Eur RP*	*DF-EW*	*DF-KD*	*DF-Gr*	*Eur WW*	*Eur RP*
120x120	4.0	0.0576	40	2.3040	75,000	53,000	38,000	55,000	56,000	172,800	122,112	87,552	126,720	129,024
150x120	3.0	0.0540	1	0.0540	75,000	53,000	38,000	55,000	56,000	4,050	2,862	2,052	2,970	3,024
150x120	4.0	0.0720	10	0.7200	75,000	53,000	38,000	55,000	56,000	54,000	38,160	27,360	39,600	40,320
180x120	3.0	0.0648	1	0.0648	75,000	53,000	38,000	55,000	56,000	4,860	3,434	2,462	3,564	3,629
180x120	4.0	0.0864	3	0.2592	75,000	53,000	38,000	55,000	56,000	19,440	13,738	9,850	14,256	14,515
240x120	3.0	0.0864	2	0.1728	75,000	53,000	38,000	55,000	56,000	12,960	9,158	6,566	9,504	9,677
240x120	4.0	0.1152	1	0.1152	75,000	53,000	38,000	55,000	56,000	8,640	6,106	4,378	6,336	6,451
270x120	3.0	0.0972	8	0.7776	75,000	53,000	38,000	55,000	56,000	58,320	41,213	29,549	42,768	43,546
270x120	4.0	0.1296	4	0.5184	75,000	53,000	38,000	55,000	56,000	38,880	27,475	19,699	28,512	29,030
330x120	4.0	0.1584	3	0.4752	75,000	55,000	40,000	55,000	56,000	35,640	26,136	19,008	26,136	26,611
360x120	3.0	0.1296	3	0.3888	75,000	55,000	40,000	55,000	56,000	29,160	21,384	15,552	21,384	21,773
360x120	4.0	0.1728	9	1.5552	75,000	55,000	40,000	55,000	56,000	116,640	85,536	62,208	85,536	87,091
Total				**7.4052**						**555,390**	**397,314**	**286,236**	**407,286**	**414,691**
% of Selling Price										2.844%	2.034%	1.466%	2.085%	2.123%

Notes: 1 tsubo equals 3.3 square meters or 35.5 square feet Selling price of a 45 tsubo house approximately ¥19,531,250 represent approximately 80% of the hirakaku (by number) and 73% of the hirakaku volume used in this house. The market prices for the five different hirakaku products and sizes displayed in columns 6-10 were obtained in November 2005. The cost analysis shows that the lowest priced hirakaku option (green, solid sawn DF) represents just 1.5% of the total selling price. In contrast, the most expensive hirakaku product (DF glulam) is about twice as expensive as the green DF product, although it still represents just 2.9% of the total selling price of the house. It is also useful to note that solid sawn, kiln-dried DF hirakaku is a less expensive option than either European whitewood glulam or European redwood glulam lumber. Furthermore, the price premium for DF glulam relative to either European whitewood glulam or redwood glulam is only about 0.7% (or about ¥150,000 per house). Thus solid sawn, kiln-dried DF hirakaku is cheaper, stronger, more natural, and healthier than imported European glulam. It is particularly important to note that this cost analysis was conducted prior to the surge in the value of the Canadian dollar and the euro relative to the US dollar. As a result, the price of US Douglas-fir solid sawn beams and glulam lumber is substantially more competitive in the current market.

While this cost analysis could provide an opportunity for US and Japanese DF lumber manufacturers to promote the benefits of using DF hirakaku, there are several factors that discourage the use of DF hirakaku by pre-cutters. The first factor has to do with the willingness of European suppliers to provide stable price quotes for up to six months out. Japanese pre-cutters emphasize that they typically will provide home builders with 12 month price quotes and they need stable raw material costs in order to do this. They complain that DF prices (both imported and, to a lesser extent, domestically produced) are subject to frequent and occasionally drastic price fluctuations which significantly impact their profitability. The second factor has to do with product downfall that is associated with crooked lumber. Pre-cutters report that it is difficult for them to use crooked lumber in their precutting machinery. As a result, crooked lumber is often cut and used for smaller structural components, although this results in a not inconsequential volume of waste material that must be disposed of. This combination of material downfall and increased waste disposal costs is viewed as a serious problem by P&B pre-cutters. Tied into this concern about material waste costs is the fact that European suppliers are willing to provide exact lengths for hirakaku products whereas this is not the case with US and Japanese DF producers.

Final Recommendations

Recent developments in Japan and the US have favorably affected the competitive position of US softwood lumber in Japan and renewed US exporters interest in the Japanese market. The weakening of the US dollar relative to its major competitors in Japan, a weak US housing market and the announced export tariffs on Russian logs all bode well for US lumber in Japan. Therefore, it is in the US forest products industry's best interest to work with their Japanese customers to convince Japanese home builders and home buyers that using DF hirakaku is worth the small price premium it commands in the market. For example, a promotional campaign emphasizing the strength, durability and natural beauty of Douglas-fir structural lumber could be very helpful in Japan. In the absence of this type of promotional effort, DF hirakaku products can be expected to continue losing market share. One recent estimate derived from interviews with pre-cutters and lumber wholesalers suggests that between 2000 and 2010 the markets for hirakaku products could change significantly.

Table 8.4: Estimates of *hirakaku* market share changes from 2000 to 2010.

	2000	2010
DF, green	45%	40%
DF, kiln-dried	30%	20%
DF, glulam	8%	10%
Eur. redwood glulam	6%	25%
Eur. whitewood glulam	11%	5%

Given the serious constraints associated with establishing and maintaining an adequate supply of imported DF hirakaku in Japan, we would recommend that the US industry not develop a branding program for DF hirakaku in Japan. This decision is further supported by the fact that there is currently a large, well established domestic DF sawmill industry in Japan. The fact that Japanese DF sawmills have already developed branded hirakaku products further supports this recommendation. It is difficult to see where US sawmills would have a competitive advantage over Japanese sawmills producing branded products, particularly considering the well established distribution channels that the Japanese sawmills have already developed within the pre-cutting and home building industries. Despite this, there are substantial opportunities for US DF sawmills to establish direct supply relationships with medium-sized regional homebuilders and larger national homebuilders. These homebuilders have become extremely cost conscious in the past decade and many expressed interest in purchasing building materials directly from US sawmills as a way to reduce distribution channel costs and improve product quality.

In addition, there is a good opportunity to export kiln dried DF glulam lamina to glulam manufacturers in Japan. This is particularly true if the US industry were to promote DF glulam hirakaku as a superior product to either European whitewood or redwood glulam. However, it would be important for US lamstock producers to resolve the forward pricing issue that currently provides European glulam manufacturers with a competitive advantage. There is also an opportunity to export lamstock produced from other species as well. For example, Alaska yellow cedar lamstock for glulam sill plates (*dodai*) and Sitka spruce for glulam hirakaku. Further research would be required to develop a better assessment of the potential for exporting lamstock to Japanese glulam manufacturers.

9.0 Literature cited

Boardman, P., I.L. Eastin and J. Perez-Garcia. 2004. Global Emerging Market Opportunities for Structural and Other Wood Products. Final Report Submitted to the American Forest and Paper Association. 83 pages.

Braden, Rosemarie, Bruce Lippke, Kyle Cunningham, and Ivan Eastin. 2000. An Assessment of Market Opportunities for Alaskan Forest Product Exports, in Proceedings of the Alaska Value-Added Forest Products Technology and Utilization Opportunities Conference, Sitka, Alaska: Alaska Wood Utilization R&D Center, U.S. Forest Service.

Cunningham, K. and I. Eastin. 2002. Factors that Influenced the Export Success of Forest Products Companies in the Pacific Northwest During the 1997-1998 Japanese Economic Downturn. ***CINTRAFOR Working Paper 89***. University of Washington, Seattle, WA.

Eastin, I.L. and J. Cao. 2006. Japan's Impacts on Forests in the Pacific Northwest. ***Western Forester, V51, N3.*** pp: 4-7.

Eastin, I.L., J. Roos And K. Cunningham. 2004. Factors That Influence The Export Success Of Forest Products Firms In The Pnw**.** ***Forest Products Journal*****.** **V(54)N(7/8).** Pp:29-34.

Eastin, I.L., J. Roos, And P. Boardman. 2004. A Technical Assessment Of The Market For Wood Windows In Japanese Post And Beam Construction. *Forest Products Journal* V(54)N(6). Pp:23-30.

Eastin, I.L. and J. Fukuda. 2001. The Impact of Regulatory Changes on the International Competitiveness of the Canadian Softwood Lumber Industry. ***Forestry Chronicle V(77)N(2).*** pp:1-9.

Eastin, I.L. 2004. Structural Analysis of Post and Beam Homes In Japan. CINTRAFOR NEWS Winter.

Eastin, I.L. and C. Larsen. 2004. Branding Douglas-fir Lumber in Japan: Switching from a Commodity to a Niche Market Focus. CINTRAFOR News Winter

Eastin, I.L., J. Roos, and P. Tsournos. 2003. Niche Market Opportunities for Alaskan Forest Products in Japan. ***CINTRAFOR Working Paper 91***. University of Washington, Seattle, WA.

Eastin, I.L. 2002. Market Opportunities for Alaska Yellow Cedar and Western Red Cedar in Japan. Final Project Report Submitted to the Alaska Manufacturers Association. 71 pages.

Eastin, I.L. 2001. The Market Outlook for Softwood Lumber in Japan. In: Proceedings of the Conference on Value Chain Management in the Forest products Industry. Edmonton, Alberta. pp: 158-175.

Eastin, I.L., P. Boardman, and J. Perez-Garcia. 2001. An Update on Japan's Proposed Safeguard Action Against Softwood Lumber Imports. CINTRAFOR News V(19)N(1). pp:4-6.

Eastin, I., P. Boardman, and J. Perez-Garcia. 2001. Japan Wood Market Research Study: A Competitive Assessment of the Japanese Forestry and Forest Product Sectors. ***CINTRAFOR Working Paper 87***. University of Washington, Seattle, WA.

Eastin, I., J. Roos, and P. Boardman. 2001. A Technical Evaluation Of The Market For US Wood Windows Within The Japanese Post And Beam Construction Industry. ***CINTRAFOR Working Paper 84***. University of Washington, Seattle, WA.

Eastin, I.L. 2001. Impact of Regulatory and Market Changes on Competitiveness of Softwood Lumber Exports to Japan. Progress Report Submitted to the Softwood Export Council. Portland, OR.

Eastin, I. and R. Braden. 2001. Opportunities for Alaskan Wood Products In Japan**. *CINTRAFOR Working Paper 81***. University of Washington, Seattle, WA.

Eastin, I.L. and J. Fukuda. 2000. The Impact of Regulatory Change on the Canadian Softwood Lumber Industry. ***CINTRAFOR News V(17) N(2) Winter 2000***, pp:1,3-4.

Eastin, I.L. and P. Boardman. 2000. Technology Transfer in the Japanese 2x4 Residential Construction Industry. In: Proceedings of the Canadian Forestry Industry Conference: Exploring New Paths, Branding Wood Products. Edmonton, Alberta. October 31st-November 2nd, 2000.

Eastin, I. and R. Braden. 2000. Survey of International Opportunities for Alaska Softwood Producers. Final Report for the State of Alaska. 105 pages.

Eastin, I.L. and P. Boardman. 2000. Regulatory Change in the Japanese Residential Construction Industry. ***CINTRAFOR News V(15 N(2) Fall 2000***, pp:1,3-5.

Eastin, I.L. 2000. Factors that Impact the Competitiveness of US Softwood Lumber In Japan. Project Progress Report Submitted to the Softwood Export Council. Portland OR.

Eastin, I.L. and R. Hashizume. 2000. Analysis of 2x4 Technology Transfer to the Japanese Residential Construction Industry. ***CINTRAFOR Working Paper No. 74***. University of Washington, Seattle, WA.

Eastin, I.L., T.C. Ossinger, R.B. Williams, S.R. Shook, R. Hashizume, J. Roos. 2000. A Technical Assessment of the North American-style 2x4 Residential Construction System in Japan. ***CINTRAFOR Working Paper No. 70.*** University of Washington, Seattle, WA.

Gaston, C., D. Cohen and I. Eastin. 2006. Wood Market Trends in Japan. FORINTEK Special Publication 43r. Vancouver.

Japan Lumber Journal 2004. News in Brief V45,N12, page 9.

Japan Lumber Journal, 2006. News in Brief V47, N9, page 10.

Japan Lumber Reports, 2005. Topics, N 433, page 7.

Roos, Joseph and I.L. Eastin. 2005 Market Segmentation and Analysis of Japan's Residential Post and Beam Construction Market. ***Forest Products Journal***. **V(55)N(4)**. pp:1-7.

Sasatani, D., J. Roos, A. Brackley and I. Eastin. 2005. Niche Market Opportunities for Alaskan Forest Products in Japan (2005 Update). ***CINTRAFOR Working Paper No. 100***. University of Washington, Seattle. (55pp)

Taylor, R.E. and Associates, 2003. Opportunities for US Wood Product Exports to Japan. Market Research Report Submitted to the American Forest and Paper Association