

Chapter 4

Influences on Japanese demand for wood products ¹

Highlights

- Wood use in Japan stems mostly from residential construction, which rivals the United States market in terms of number of housing starts, and presents tremendous market opportunities for overseas producers of structural wood products.
- Post & beam type of construction dominates, but markets for North American-style platform-frame construction are steadily growing.
- Several trends related to wood use are driving the demand for structural wood products in Japan, including the growing importance of high-performance, aesthetically pleasing wood products, the adoption of platform-frame building technologies and engineered wood products, and the emergence of a pre-cut component manufacturing sector.
- Changes are under way in the markets for non-structural wood products for interior applications as Japanese consumer tastes shift towards the use of lighter coloured softwoods and western styles.
- Changing demographics (population stability and an increasing proportion of elderly persons) are having an impact on the use of wood in Japan.
- Changes in regulatory requirements regarding housing in Japan, including the Government Housing and Loan Corporation, the Building Standard Law and the Housing Quality Assurance Law, will have a considerable impact on wood products imports and business relations.
- The future of wood product imports to Japan will be characterized by further global competition, the potential for increased trade protectionism, the need for high performance wood products and systems, and growth in the repair and remodelling market.

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Secretariat introduction

The secretariat would like to thank Drs. David Cohen, Christopher Gaston, and Robert Kozak from the University of British Columbia, Forintek Canada Corporation, and the University of British Columbia, respectively, for this insightful chapter on the demand drivers for ECE region exports to the important Japanese market. While North American companies have been engaged in the Japanese markets for decades, the exports of logs and sawnwood from Europe and the Russian Federation have escalated over the last 5 years, with the exception of a downturn during the 1998-1999 Asian economic crisis. Russia was also an important supplier of logs to Japan before 1990.

This special chapter focuses on a country's wood products markets outside of the ECE region, but which strongly influences the region's production and trade. The Review has annually reported on the Japanese market, but with this chapter's analysis, the reasons behind the market forces are exposed.

The factors influencing the demand for wood products in Japan are changing as noted in this chapter. These changes have been reflected in the trends in commodities that Japan imports. They will also have significant implications for ECE region exporters, especially in the medium and long term.

This chapter is one of a continuing series of special chapters in the Review that features a country's wood products markets, either a trading partner or a competitor, from outside the ECE region.

4.1 Introduction

In the 1990s, Japan became an increasingly important market for high value European wood products, including sawnwood and laminated sawnwood. This growth was exemplified by the dramatic increase in imports of sawn softwood from Europe between 1992 and 2000. In 1992, there were only 10,000 m³ exported from Europe to Japan, but this had grown to over 2.7 million m³ by 2000 (Japan Wood Products Information and Research Center (JAWIC), 2001). Many of the wood products exported from Europe to Japan are high quality, kiln-dried and laminated products from traditional producers losing European market share to lower cost eastern European and Baltic manufacturers. European exports to Japan are expected to continue for the next decade as increasing European production strives to capture export markets.

While much of this increase can be attributed to marketing strategies and policies of European producers, the changing requirements of Japanese wood use have provided, and will continue to provide, opportunities for expanding exports of higher value wood products from Europe to Japan. The majority of wood products exports

to Japan are used in house construction and remodelling. Significant changes in these sectors during the past decade have created an increasing demand for stable wood building materials and European-style building products. Understanding these changes is critical to enable European producers to take full advantage of changing opportunities in the Japanese market for wood products.

This chapter provides insight into the recent history and current trends in wood use in Japan and the key factors that will drive Japanese demand in the future.

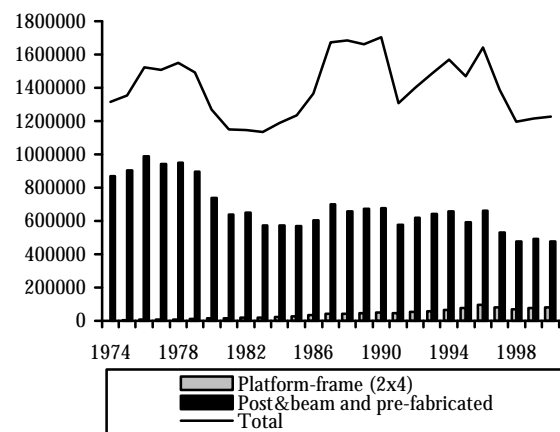
4.2 Background

Most of the solid or composite wood used in Japan is for the construction of residential housing. While this is similar to North America, the levels of home repairs and renovations in Japan are surprisingly low. As such, changes in the numbers and types of houses built in Japan have a direct and immediate impact on the demand for wood products.

During the past three decades, the Japanese housing market has rivalled the United States market in terms of overall housing starts (graph 4.2.1). This is in spite of the fact that the population of Japan is only 126 million people compared to almost 300 million in the United States. However, it is not just the sheer size of this market that makes it attractive. Japan, like Canada and the United States, has a tradition of wood housing. In addition, the Japanese people, unlike Europeans, have embraced many aspects of North American house design and construction over the past 50 years (graph 4.2.2).

GRAPH 4.2.1

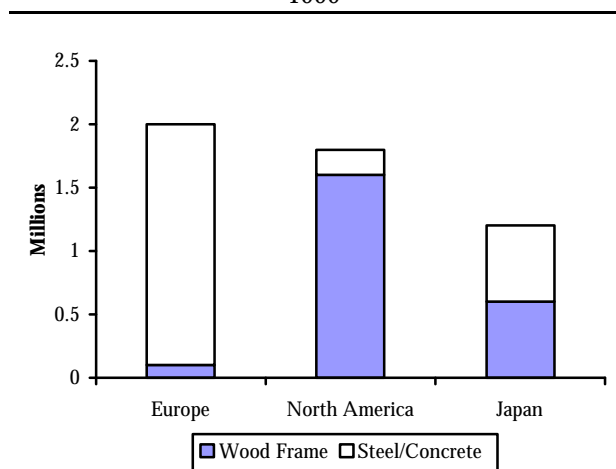
Japanese housing starts, 1974 -2000



Source: JAWIC, 2001.

GRAPH 4.2.2

Housing starts in Japan, Europe and North America, 1999



Sources: Jaakko Pöyry (JPC Databanks), 2000; Euroconstruct, 2000; APA Economic Report, 1999; United States Bureau of the Census, 2000 and Japanese Ministry of Construction, 2000.

Houses in Japan are replaced every 20-30 years, most frequently due to loss of structural integrity, decay or a desire to change styles. There are historical and practical reasons for a lifespan less than half of that in Europe or North America for wood houses. Traditionally, earthquakes have led to fires decimating many urban centres. In these coastal regions, houses were built as temporary structures and belongings were portable. When earthquakes occurred people packed up their belongings and waited out the fire in the surrounding and safe mountainsides. They later returned to build houses from wood and paper as only semi-permanent structures. In addition, current building practices in the humid Japanese climate, combined with a culture that does not promote house maintenance, often lead to decay and/or the loss of structural integrity after only a short time².

4.3 Wood use trends

4.3.1 Substitution trends

In terms of wood supply, Japan remained mostly self-sufficient up until the early 1960s when the first wave of

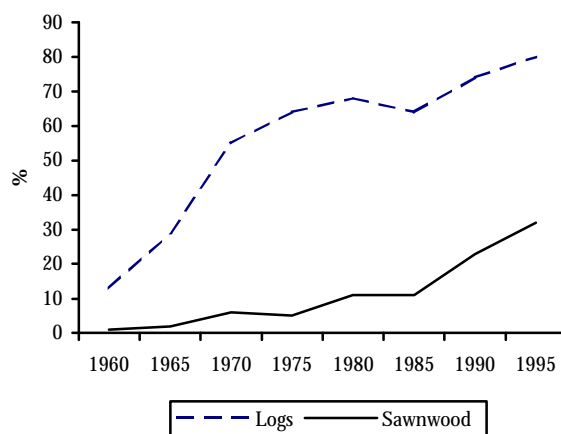
² For more information, see Trends in the Japanese Housing Market by Greg Lampert and Ikehata Shin, 2000. NHA 2514. Prepared for Canada Mortgage and Housing Corporation, Ottawa, Ontario, Canada. Also see Wood Market Trends in Japan by Christopher Gaston, David H. Cohen and David Fell, 2000. Special Publication SP-43, ISSN 0824-2119, Forintek Canada Corporation Report published in cooperation with Forest Renewal British Columbia (Victoria, BC, Canada) and Natural Resources Canada (Ottawa, Ontario).

substitution occurred in wood products. Logs were imported from North America and Southeast Asia to partially replace domestic harvests. The switch from the use of exclusively domestic logs to a heavy reliance on imported logs was brought about by factors such as the high cost of domestic harvesting and a shortage of rural labour in the domestic forest industry. Increasing domestic log costs were a direct result of Japan switching to imported oil for centralized energy production and the dramatic decline in the use of wood (predominantly as charcoal) to generate regionally based power. This dramatically increased the cost of log production since the by-products from the generally poor quality Japanese logs no longer had value. Within a decade, Japan became the largest log-importing nation in the world.

The second wave of substitution occurred during the 1980s as supplying regions restricted log exports due either to domestic demand (e.g. environmental restrictions in the United States) or policies that encouraged production to move up the value chain (e.g. log export restrictions in Indonesia) (graph 4.3.1). As a result, domestically produced sawnwood, produced both from imported and domestic logs, was replaced by imported sawnwood. Domestically produced plywood, often from imported logs, was replaced by imported plywood. This second wave was a result of a combination of factors including the rationalization of the Japanese sawmilling industry, a decline in both the quantity and quality of logs available on the world market, increasing demand due to high levels of housing starts and a strengthening yen. Japan imports four major product types: sawn softwood, sawn hardwood, softwood logs and plywood (graphs 4.3.2, 4.3.3, 4.3.4 and 4.3.5).

GRAPH 4.3.1

Japan's log versus sawnwood imports, 1960 -1995

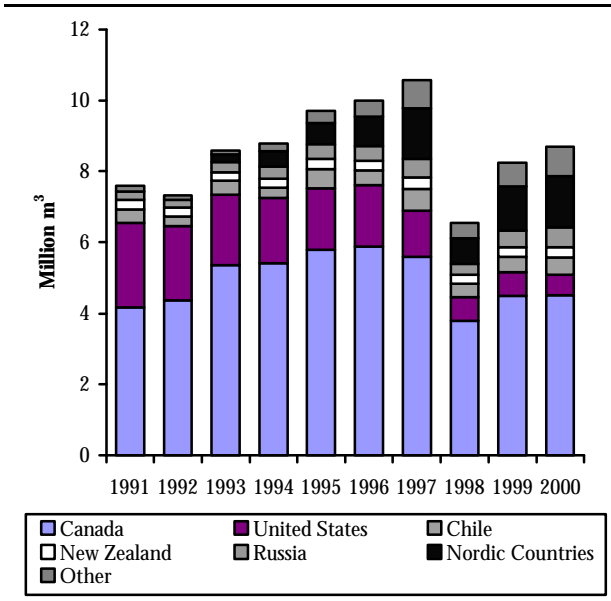


Note: This proportion does not include lumber produced in Japan from imported logs or cants.

Source: Japan Lumber Journal, 1998.

GRAPH 4.3.2

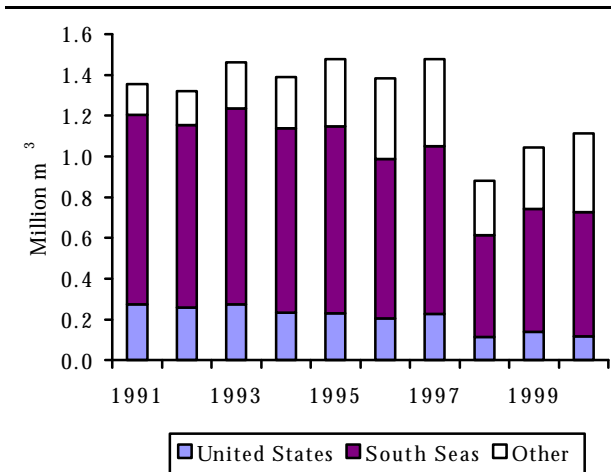
Japan's sources of imports of sawn softwood, 1991-2000



Source: Japan Tariff Association, 2001.

GRAPH 4.3.3

Japan's sources of imports of sawn hardwood, 1991-2000

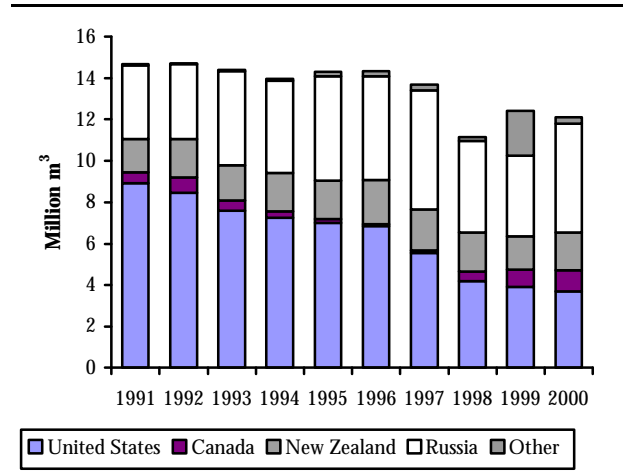


Source: Japan Tariff Association, 2001.

A third wave of wood substitution began in the early 1990s and was characterized by a substitution by type of wood products being demanded in the home-building industry. Traditionally, most wood house construction in Japan had been (and continues to be) post & beam (called "timber frame" in North America). Large structural beams and posts were cut and notched on site for immediate assembly by skilled master carpenters. Very

GRAPH 4.3.4

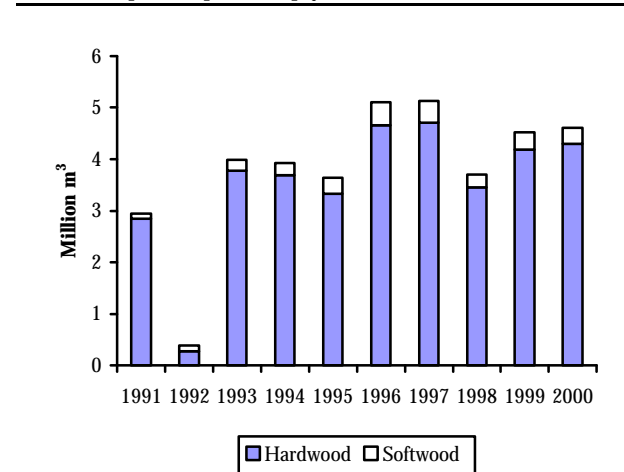
Japan's sources of imports of softwood logs, 1991-2000



Source: Japan Tariff Association, 2001.

GRAPH 4.3.5

Japan imports of plywood, 1991-2000



Source: Japan Tariff Association, 2001.

few metal connectors were used (including nails or bolts), but rather elaborate systems of joints were employed (figure 4.3.1). Typically, large solid green members were used and the posts and beams air-dried together in place over time. However, a shortage of skilled carpenters and high labour costs, coupled with a general willingness to lower the cost of a built home (which is about twice that of North America, excluding land costs), meant that things had to change. This led to a number of dramatic shifts, all of which affected the types of wood products demanded in Japan in the 1990s. Each is discussed in turn below.

FIGURE 4.3.1
Notched joints typical of post & beam construction in Japan



(Photographs courtesy of C. Gaston)

4.3.2 Wood appearance versus performance

Prices of home construction sawnwood in Japan have always been at a considerable premium over those of North America. This has largely been related to the aesthetic qualities of the wood products being demanded for post & beam construction, such as clear (knot-free) wood, large dimensions, tight growth rings and consistent colours. In the past, the performance of the house structure was almost secondary to aesthetics, epitomized by the fact that houses were not expected to last that long before being replaced.

However, the Kobe earthquake of 1995 changed this. Japanese home consumers began to seriously question the safety of homes – namely the styles and materials used in construction. This shift has had far reaching impacts on the Japanese housing market, either directly or indirectly affecting all of the remaining changes listed below.

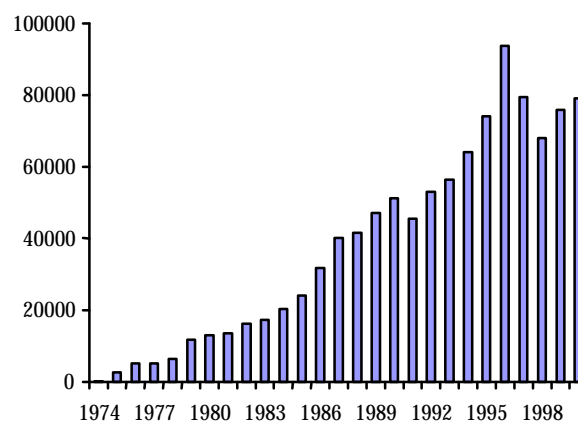
4.3.3 Adoption of platform -frame building technology

Since its introduction in the early 1970s, Japan has gradually adopted the North American style of platform frame technology (referred to as 2x4 in Japan). However, this growth intensified in the 1990s, leading to a peak, before the economic turndown, of nearly 100,000 new 2x4 homes being built in 1996 (graph 4.3.6). Even taking the economic turndown into account, 2x4 starts as a percentage of total wood starts continue to rise, reaching an all-time high of more than 14% in 2000 (table 4.3.1).

The adoption of the platform-frame housing style served to create a captive market for North American "dimension lumber" (2x4 inches nominal, 2x6, 2x8, etc.) and sheathing products (plywood and oriented strand board (OSB)). Trade associations of sawnwood manufactures in the United States and Canada

GRAPH 4.3.6

Japan 2x4 single -family housing starts, 1974 -2000



Source: JAWIC, 2001.

TABLE 4.3.1

2x4 single -family housing starts as a percentage of total wood starts in Japan, 1979 to 2000

1979	1.3%	1990	7.0%
1980	1.7%	1991	7.3%
1981	2.1%	1992	7.9%
1982	2.4%	1993	8.1%
1983	2.9%	1994	8.9%
1984	3.4%	1995	11.1%
1985	4.1%	1996	12.4%
1986	5.0%	1997	13.0%
1987	5.4%	1998	12.5%
1988	6.0%	1999	13.4%
1989	6.6%	2000	14.2%

Source: JAWIC, 2001.

successfully introduced their styles into Japan, creating a demand for their standard sawnwood sizes. However, unlike dimension lumber used in North America, a proprietary “J-grade” evolved, that in essence has both structural and aesthetic requirements. This grade offers considerable price premiums over the typical North American construction grades.

In addition to the adoption of the 2x4 system, Japanese builders were also interested in improving the performance and lowering the cost of building post & beam homes. In some cases, this has led to the adoption of a “hybrid” building style, which strives to take advantage of the best characteristics of the two building styles (figure 4.3.2). Examples of this include: 1. adding plywood or OSB to post & beam structures to improve lateral load resistance; 2. the use of non-load bearing members between structural posts (called mabashira in Japan); 3. the use of metal connectors and hangers to complement or even replace traditional joinery; and 4. the use of panellized construction components such as wall panels.

4.3.4 Growth in “pre -cut” component manufacturers

To address the problem of the declining number of skilled traditional post & beam carpenters and the high costs associated with on-site joinery in the past decade, the growth of pre-cutting posts and beams manufactured in factory-automated environments has been impressive. The number of pre-cut plants in Japan increased from 181 in 1986 to 890 in 1998, with the number of housing units supplied increasing from 23,000 to 210,000 over the same period of time (Softwood Export Council). While more recent estimates are not available, anecdotal evidence points to an even more dramatic growth in the last few years. The most significant impact of this trend has been

a change from the use of green, large dimension lumber to kiln-dried timbers and glue laminated posts and beams (see next section). There is a growing use of pre-fabricated systems, including roof trusses and walls pre-built in factories (figure 4.3.3). However, pre-cut manufactures mostly produce ready-to-assemble posts & beams (figure 4.3.4).

4.3.5 Adoption of engineered wood products

The popularity of glue-laminated (glulam) sawnwood can be linked to many of the other trends noted, including increased performance, ease of use in pre-manufactured systems and lower costs relative to solid kiln-dried timbers. In 1999, laminated posts and beams had shares of 66% and 29% of the market, respectively (Japan Lumber Reports). Japan uses glulam for non-structural purposes as well (primarily imported from the South Seas) (graph 4.3.7). Finally, in addition to the

FIGURE 4.3.3

Pre-fabricated wall system in Japan



(Photograph courtesy of C. Gaston)

FIGURE 4.3.2

Examples of post & beam “hybrid” construction in Japan



(Photographs courtesy of C. Gaston)

FIGURE 4.3.4

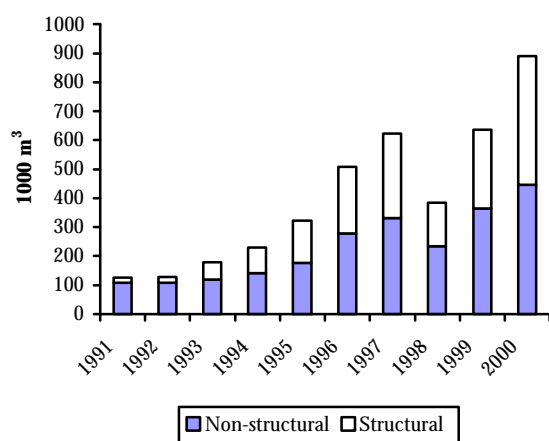
Pre-cut posts and beams ready to assemble



(Photograph courtesy of C. Gaston)

GRAPH 4.3.7

Japanese imports of glulam, 1991 -2000



Source: Japan Tariff Association, 2001.

imports shown in the graph, Japan produces roughly 300,000 cubic metres of glulam annually, much of which is produced from imported sawnwood products.

While Japan does use engineered wood products such as laminated veneer lumber (LVL) and parallel strand lumber (PSL), their use is minor compared to glulam. Wood I-joists have not yet been adopted in Japan.

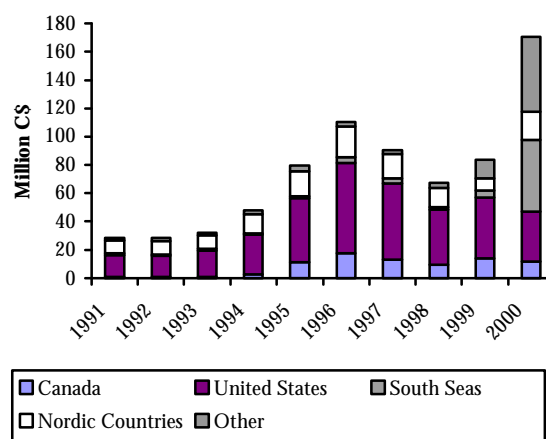
4.3.6 Interior wood use demand changes

In addition to the structural wood use substitutions that have occurred in Japan in the recent past, there have also been substitutions for interior uses of wood. Most of these are related to a demand for lighter colours, and more of a “western” style, both of which have been an advantage for producers and exporters of softwoods. This

has been true for wood furniture, cabinetry, flooring, wainscoting, windows, doors and other interior products. In the last decade, imports of wood products for interior use have continually been increasing, with the exception of 1997 and 1998 economic downturn. Imports for two value-added products, wooden windows and doors are currently recovering from the recent economic downturn (graphs 4.3.8 and 4.3.9). Lastly, it is notable that wood is steadily displacing the use of other materials like steel and plastics in interior applications. A major driver is the importance that the Japanese place on the concept of the “healthy house” and indoor air quality.

GRAPH 4.3.8

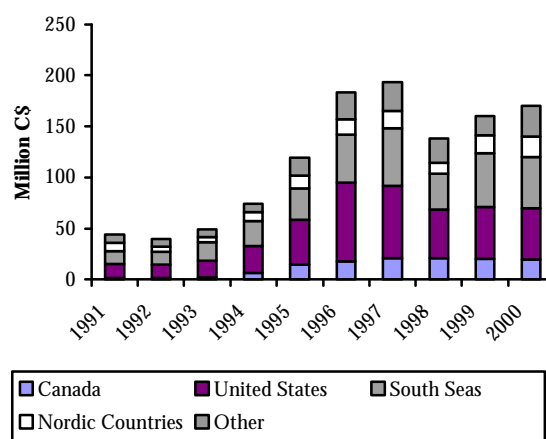
Japanese imports of wooden windows, 1991 -2000



Source: Japan Tariff Association, 2001.

GRAPH 4.3.9

Japanese imports of wooden doors, 1991 -2000



Source: Japan Tariff Association, 2001.

4.4 General trends impacting wood use

As Japan looks to the future, there are two important trends that will have a strong impact on wood use: 1. demographics; and 2. the changing regulatory environment.

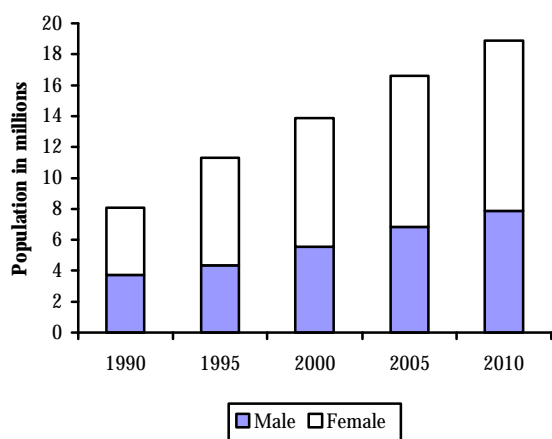
4.4.1 Demographics

The population in Japan is expected to stabilize and actually start to shrink during the first decades of the twenty-first century. Low birth rates, fewer marriages and very little immigration contribute to this scenario.

This is combined with a dramatic increase in the proportion of the elderly population (over 70 years). Thus, while the population is expected to remain relatively stable at 125 to 126 million until 2020, the

GRAPH 4.4.1

Number of elderly people (over 70 years) in Japan, 1991-2010



Sources: Japan Census, Statistics Bureau and Statistics Center, 2001.

number of elderly will increase dramatically (graph 4.4.1).

This trend of stable populations and an increasing proportion of the population over the age of 70 years will have a dramatic impact on design, layout, use and construction of houses. There are already signs of this important demographic shift, for example, barrier-free access, elevators, low-rise stairs and larger bathrooms to accommodate wheelchairs. This will ultimately have a positive impact on the use of wood and the types of wood products imported.

4.4.2 Changing regulatory environment

Japan is in the midst of a “big bang” in the residential construction sector, driven by changes in both mandatory and voluntary guidelines and regulations. There are three

important areas of change in the regulatory mechanisms regarding residential construction. The first consists of changes to the Government Housing and Loan Corporation (GHLC) implemented between 1998 and 2000. This institution is primarily concerned with providing mortgages for new house construction and reform. The second consists of changes to the Building Standard Law (BSL). Changes that transform the BSL from a specification-based building code applicable to only certain types of construction, to a performance-based building code that applies to all types of residential construction were initiated in May 1998 and are currently being implemented. The third important area of change is the new Housing Quality Assurance Law (HQAL) enacted in April 2000. This law requires interim and final building inspections, which lead to mandatory 10-year warranties. The GHLC and BSL require completion guarantees for new houses being constructed and encourage the use of voluntary performance measures for new house construction.

4.4.2.1 Government Housing and Loan Corporation

According to the 1998 revision of the Government Housing and Loan Corporation Manual, there are three classifications for housing: 1. barrier-free; 2. energy saving; and, 3. durable. The objective of barrier-free housing is to make a house “friendly” in case one of its inhabitants is disabled or has decreased physical capacities. This is occurring more frequently due to the aging society discussed above. Specifics include minimum interior opening sizes, minimum widths of passageways, minimum sizes of bathrooms, non-slip floor surfaces, use of handrails, etc.

Energy saving houses must have a structure that will conserve heat in accordance with GHLC specifications and standards provided by the Ministry of Construction, Energy Organization. Specifications provide specific details on both the design and installation to meet a variety of government guidelines regarding air tightness, ventilation and window performance. The details ensuring energy efficiency are expected to become more rigorous given the Japanese Government’s and consumers’ attitudes toward energy efficiency and global warming.

Durability is specified for all structural aspects of homes, from foundations to wall systems. This includes the durability of wood by species, increased foundation heights above finished grades, improved crawl spaces, attic ventilation requirements and more. The focus on durability is due to the Japanese concern with stability given the devastation of the Kobe earthquake of 1995.

To qualify for the Standard Interest Rate Loan, the house must qualify as both durable and barrier-free or both durable and energy saving. Many of the mandatory and recommended practices necessary to qualify for each of the three standard loan criteria may need to be "corrected" for specific regional requirements.

It is expected that some recommended practices may become mandatory in the future. These regulations apply to both traditional post & beam houses and to 2x4 houses, whereas in the past, they only applied to 2x4 houses. The importance of the GHLC requirements cannot be overstated since 45% of all funding required to construct new houses and over 75% of all funds that are borrowed to construct new houses are provided by the GHLC.

4.4.2.2 Housing Quality Assurance Law

One of the key parts of the Housing Quality Assurance Law requires homebuilders to provide homebuyers with a 10-year warranty on all new houses built in Japan. This warranty must cover the house against structural defects and low durability. Included in the definition of low durability is rain penetration into the structure, a problem in some North American residential construction as well. Homebuyers may make a claim against the homebuilder if the structural stability or durability of a house does not meet a specific set of criteria for structural performance, water leakage and external cracks. This law includes mechanisms for dispute resolution and for small firms to have adequate insurance to offer this type of warranty.

To ensure that homebuyers are not stuck either with unfinished houses or houses under heavy lien, there is also a provision in the HQAL (the Completion Guarantee System) that protects homebuyers against defaulted builders or contractors. This system provides homeowners with insurance so that there will be sufficient funds to complete construction of the house in case of a bankruptcy. While larger builders are of sufficient financial strength and size to offer this insurance on their own, most small builders are struggling with new approaches to provide both the 10-year house warranty and the completion guarantee.

The third part of the HQAL is voluntary, but is proving to have some of the greatest impact, at least in the short term. These are the Nine Voluntary Performance Indicators (table 4.4.1). They provide a set of standards for nine indicators against which the performance of specific houses can be compared. The overall objective of this approach is to provide homebuyers with an unbiased means of comparing nine important criteria both between different houses and different homebuilders.

TABLE 4.4.1

Nine performance indicators in Japan	
Indicator	Explanation
Structural stability	Earthquake-proof, loading, foundation strength
Fire safety	Fire spread time, heat sensors, fire escapes, etc.
Durability	Decay and deterioration
Ease of maintenance	Ratio of exclusive pipes to common pipes ¹
Energy efficiency	Insulation, window types, etc.
Air quality	Ventilation, absence of formaldehyde
Light environment	Ratio of exterior openings to wall area
Acoustics	Insulation for noise
Barrier-free design	Convenience for elderly and physically impaired

¹ Maintenance is facilitated when water and drain pipes share common passage ways, rather than when single, "exclusive" pipes are run individually.

Source : Japan Lumber Journal, 2000.

4.5 Summary

The future of wood products use in Japan will be influenced and characterized by a variety of factors. There will be increasing global trade, resulting in a highly competitive market environment, a growing number of producing regions targeting Japan with both primary and secondary wood products, and the potential for increased trade protectionism (e.g. government imposed "safeguards"). In addition, the climate of regulatory reform will continue in Japan. These changes will probably result in the creation of a house construction sector that increasingly relies on high performance wood products and systems to meet stringent regulatory requirements, as well as performance-based labelling to assure that these requirements have been met. This environment presents potential, yet challenging, market opportunities for producers of engineered wood products and wood building systems.

The old adage, "the only thing constant is change", could not be more true than for Japan, especially with respect to its demographic make-up and economic well being. There are several notable shifts occurring in Japan, each likely to impact the degree of wood products use. For example, the home repair and remodelling sector (termed 'reform' in Japan) is becoming more and more important as policies are put forth which encourage long-lasting and durable homes. There is an emerging trend towards more "do-it-yourself" repairs and remodelling.

So-called “healthy houses”, using natural and durable materials and minimal energy requirements, are becoming very popular, especially in northern Japan. The definition of what constitutes a “healthy house” provides opportunities for focused exporters into this market. Lastly, while housing starts are expected to decline or remain stable in the future, markets for seniors’ housing,

non-residential buildings and value-added products are expected to grow.

All of these shifts point to increased opportunities for wood products manufacturers to export products into Japan. In the near future, the strategic focus both for European and North American producers should be on continuing to take advantage of these market opportunities, while fending off market threats.

4.6 References

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