

C I N T R A F O R

Working Paper 86

[Back to Publications List](#)

Report on the Taiwan Market for Wood-Frame Construction and Softwood Building Materials

Rose Braden. 2001

Executive Summary

With the help of foreign investment in the 1960s, and deregulation of Taiwan's financial sectors in the 1980s, Taiwan emerged from its agrarian roots to become one of Asia's leading producers of high-value goods. The country's strategy of producing capital and technology intensive goods for export elevated Taiwan to the position of one of Asia's leading economies. It also earned the status of one of the four Asian Tigers (with Hong Kong, South Korea, and Singapore) for its "seemingly miraculous" rate of sustained growth over the 25-year period from 1965 to 1990.

Taiwan is now one of the wealthiest of the Asian countries and the 17th largest economy in the world (CIA 2001). Gross national product (GNP) has increased 72% or almost \$110,000 million from 1989 to 1999. Per capita income also increased 58% since 1989 and the rate of personal savings is among the highest in the world. Now that Taiwan has achieved a high level of affluence the government is turning its attention to promoting leisure time, domestic tourism, and aesthetics. As part of this emphasis on aesthetics, the use of softwood logs, lumber, and building materials in urban areas and tourist areas is increasing rapidly. The Taiwan government is replacing concrete structures at city parks with wooden gazebos and benches made of treated southern yellow pine. In rural areas the government is building more walkways and viewing platforms, government administrative offices, and public buildings of solid lumber, logs, and glue-laminated (glulam) beams. Private companies are also building communities of wood frame cabins and log frame resorts in tourist areas. In 2000, Taiwan's government shortened the workweek from six to five days. Since then, domestic tourism has surged. The Taiwan government is in the process of building new roads and improving existing highways, which should improve access to vacation areas and encourage the growth of low-rise residential communities (Miller 2000). Universities are even starting to build wood frame apartments as a means to attract professors.

Particularly important to the adoption of wood frame construction is the Taiwan government's strong support of wood as a structural building material. Wood as a structural material is viewed particularly as a means to provide more earthquake resistant housing -- a concern that has become more salient since the 1999 earthquake that killed more than 2,200 and left over 100,000 homeless. The earthquake was particularly devastating in the semi-rural areas of Taichung and Nantou, where it damaged 115,000 housing units, completely destroyed approximately 60,000 units and rendered an additional 8,000 uninhabitable. In an effort to improve the quality of wood frame construction and the ease of getting projects started, the Architecture Building Research Institute (ABRI) of the Ministry of Interior (MOI), the ministry responsible for the regulatory framework of the building codes, is receiving approval from the Construction Planning Administration (CPA) to review and revise the building codes.

While the building codes do not restrict the use of wood in private homes if they are under 14 meters or 4 stories high (with the exception that wooden roof components must be covered), the codes are prescriptive and do not outline detailed engineering requirements to ensure structural performance or proper treatment of building materials to retard fire and insects. However, wood used as a structural material in public-use and multi-family buildings is considered a "special material" and requires a special building permit that can take up to two years to obtain. This is considered a major limit to the growth of the wood frame construction industry since there appears to be more immediate potential for large public buildings constructed of wood. Fire codes also restrict the use of wood as exposed trusses and beams in roof construction. However, exposed beams and trusses are a major draw for designers to use wood in public and private buildings.

The revised codes will not only recognize wood as a "standard" building material, eliminating the lengthy review process to obtain a permit to build public or multi-family buildings of wood, they will include detailed requirements for structural aspects such as proper engineering principles, materials, and treating requirements for 2x4 and post and beam construction. ABRI is looking at North American and Japanese building codes to adapt to their own codes for wood frame construction. ABRI plans to start their review by the end of 2001 and expects to complete revisions by the end of 2002.

In another effort to promote wood frame construction in Taiwan the CPA, with US\$3.5 million from the Taiwan government, also plans to include multi-story wood frame apartments, townhouses, attached single-story senior housing, and single-family homes for low and moderate-income families in its Nantou redevelopment project. Half of the buildings in the redevelopment project are planned to be 2-3 story wood frame apartments and townhouses. The wood frame projects will be exempt from the permit process and wood will not be considered a "special material" because the CPA is overseeing the project. If the public responds favorably to the model homes the CPA plans to build more. The Canadian government has already committed to build sample modular homes in the development starting in August-September 2001. The CPA has allocated US\$56/ft² (NT60k/ping) for land and US\$37/ft² (NT40k/ping) for the completed home. The inclusion of wood frame housing in the CPA's Nantou development benefits the wood frame construction industry in two ways: it provides examples of wood frame construction in Taiwan and it shows the public that the CPA endorses wood frame construction as an earthquake resistant form of housing.

Under the Agriculture Development Act, the CPA is also rezoning 150,000-200,000 acres of agricultural land surrounding Nantou to multiple-use in increments of approximately 15,000 acres per year. The CPA will install public facilities and return half to the owner for private development and the CPA will use the other half for public redevelopment projects. Medium density areas such as Nantou and Taichung counties are considered ideal for single and multi-family wood frame housing and the newly available land is considered vital to the growth of the wood frame construction industry.

There is also growing interest in using glulam beams in large public buildings. Currently, there are only two large glulam buildings in Taiwan, yet there are plans to begin building a 40-meter bridge in October 2001 and other buildings are being considered. Response to the State of Idaho Trade Office's 2000 seminar on designing and building with glulam beams was overwhelmingly positive and the number of inquiries about glulam beams reportedly surged afterward. The conference has now become an annual event held in May and jointly sponsored by Agricultural Trade Office (ATO) Taipei, APA - The Engineered Wood Association, the Softwood Export Council, the Western Wood Products Association, ABRI, the Republic of China (ROC) Sustainable Development Committee, the Forestry Research Institute (Council of Agriculture), CABC, the Taiwan Architects' Association, the ROC Wood Construction Association, the Forestry Department of the National Taiwan University, and the Economic Daily News. ABRI and CPA have been particularly enthusiastic about the conference and the use of glulam beams and wood in public buildings in rural areas. The most promising end-market for high-grade US softwoods appears to be government projects that use solid wood and glulam beams. Not only do these large public buildings use more wood than several 2x4 homes, the project review and construction process is more stringent, which provides greater assurance that the buildings are designed and built properly.

Despite the government's support for wood frame construction, there are still many obstacles to the widespread use of wood as a structural building material in Taiwan. These include 1) widespread consumer and architect concern about the susceptibility of wood buildings to fire, termites, and water and typhoon damage, 2) limited technical knowledge about how to design and build wood structures, 3) cost, 4) difficulty obtaining financing and insurance, and, 5) limited space in urban areas for single-family homes. Since there are very few examples of wood frame construction in Taiwan, most consumers do not understand what a wood frame house is, often picturing a log home instead. These misconceptions indicate a need for US industry to educate Taiwanese architects, builders, and consumers that wood frame construction is durable, resistant to the elements if constructed properly, and more comfortable than concrete housing. It may be useful to use examples of homes in Florida that are structurally sound after being exposed to termites, typhoons, and humidity.

Even in cases where wood is used as a structural material, builders, architects and manufacturers have limited understanding about the physical differences between species, often purchasing species with lower strength ratings in favor of lower price. There is only limited information available in Taiwan about US species, the

advantages of using these species, and wooden building materials and wood frame construction in general. There are also no US representatives in Taiwan with in-depth knowledge about the technical aspects of using wood and wood-based building materials to respond to architect and builder questions. Promotion of US wood products has relied primarily on the State of Idaho's trade office, since there is no central office or individual employed by the US to educate architects, builders, and government officials about wood frame construction and US species. More recently, the Agricultural Trade Office in Taipei has begun to promote US wood products by meeting with ABRI and the CPA on building code issues and jointly sponsoring the annual glulam conference. Nonetheless, almost all interview respondents from wood products firms said that they must spend a great deal of time educating Taiwanese architects and builders about species differences, products, and technical aspects of building with wood because there is very little literature on the topic available in Traditional Chinese, Taiwan's native language. It is also important to produce technical literature in Traditional Chinese since ABRI will be referring to technical information from a variety of countries as it revises the building codes. Respondents raised the point that officials will be most likely to refer to the material that they can easily understand.

Although government officials are reportedly very motivated to revise the building codes, many suppliers and builders interviewed for this report were skeptical that the process would be completed by the government projected, 2002 completion date. In the meantime, US interests should continue to communicate with officials at ABRI and the CPA about building model homes and fire code issues. They should provide these organizations with information about North American building codes and standards as well as fire test results. In May 2001 Canada's Council on Forest Industries (COFI), Forintek, and ABRI signed a memorandum of understanding to cooperate on revising the building codes by providing technical evaluations and cooperating on testing of wood structures against termites, fire, and humidity. It may be helpful for the US to approach ABRI about entering into a similar agreement with the US forest products industry.

Several respondents said part of the slow progress that ABRI makes on code revisions is because ABRI is extremely evenhanded about reviewing information from various countries. Therefore, it may be effective for the US and Canada to work together to educate ABRI about North American building codes and wood frame building systems.

As mentioned earlier, a significant obstacle is cost. According to several builders, the average cost for a concrete or brick structure is US\$31/ft² (400,000 NT/ping ~ 1 NT=0.03054 US\$; 1 ping=32.67ft²) and the average cost of a wood frame structure is US\$56/ft². Even if a consumer decides to buy a wood frame home, financing and insurance is very difficult to obtain. While the availability of financing is vital to ensure the success of wood frame construction in Taiwan, banks are less willing to finance wood frame projects than steel or concrete projects. Some companies said banks will lend up to US\$22.66 (8,000NT) per square foot for steel or concrete construction, yet only US\$5.66 (2,000NT) per square foot for wood frame construction. Other firms said that since wood products have not passed Chinese National Standards fire tests, banks will finance only 40-50% of the value of wood frame projects, yet they finance up to 90% of concrete projects. In addition, to obtain financing, the developer must obtain insurance, and insurance companies are very reluctant to insure wood projects.

As a result of these findings, there are three recommendations for US industry to increase sales of high-quality lumber and building products to Taiwan. First, to strengthen the relationship that has already been established between the ATO and ABRI the US forest products industry should work with the ATO to provide ABRI with US building codes, technical information about proper design, construction, and maintenance of 2x4 structures written in Traditional Chinese. The US government may follow the precedent set by COFI and Forintek and sign a memorandum of agreement with ABRI to cooperatively work to revise the building code by providing technical evaluations and cooperating on testing wooden building materials for termites, fire, and humidity resistance. Second, it is paramount that the US forest products industry educate Taiwanese architects and builders about wooden building materials, US timber species, 2x4 technology, and about the advantages of wood frame homes such as increased earthquake resistance and comfort by producing and distributing brochures written in Traditional Chinese, and by holding seminars. It is also important to organize trade missions to bring Taiwanese architects, builders, and government officials to view projects in the US and meet with US firms. Third, to stimulate consumer demand for wood frame construction, the forest products industry should participate in trade shows and consider building a model home at the CPA's Nantou housing

development. While the market for wood frame construction cannot fully take off until the building code recognizes wood as an approved building material, US industry should start developing interest at the consumer, builder, and architect level now.

Full Report \$20.00: [To Ordering Instructions](#)

Back to [Publications List](#)