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A Technical Assessment of the North American-Style 2x4 Residential Construction System in Japan

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Executive Summary

Anecdotal information from US architects and contractors with experience in residential construction projects in Japan indicates that Japanese construction professionals often do not fully understand the North American-style 2x4 construction system and often employ construction techniques that can compromise the structural integrity and/or long-term performance of these homes. A recent study by CINTRAFOR estimates that 2x4 construction costs in Japan range from 2 to 2.5 times higher than in the US (Eastin *et al.* 1995), partly due to differences in the way that the technology and construction management practices are implemented in Japan. The CINTRAFOR study suggested that Japanese construction professionals could improve their cost effectiveness and improve the quality of 2x4 homes built in Japan by increasing their understanding of North American-style 2x4 construction technology and construction management practices.

This research project was designed to provide specific information about how North American-style 2x4 homes are built in Japan. The specific objectives of this research project were to:

1. provide information to help Japanese construction professionals rationalize and reduce 2x4 construction costs through a more efficient transfer of North American-style 2x4 construction technology;
2. identify areas where a more efficient transfer of North American-style 2x4 construction technology could help improve the structural integrity and long-term performance of 2x4 homes in Japan; and
3. provide information to support the development and implementation of the 2x4 technology transfer program administered by the Washington State Department of Community, Trade and Economic Development.

While the tone of this report might appear to be negative, this is not the intention. The reader should keep in mind that the primary purpose of this project was to identify construction practices that negatively impact the structural integrity and long-term performance of North American-style 2x4 homes in Japan. Given the emphasis of this project, it is unavoidable that the tone of the discussion could easily be construed as being overly negative. However, it is important to emphasize that in many of the projects visited, particularly those being built by large construction companies, the technical team observed that the quality of construction was very good. While it is always dangerous to generalize, the technical team found that larger home builders, and the home builders with more experience with the 2x4 construction technology, generally were building good quality North American-style 2x4 homes. In contrast, the team observed that the projects with the lowest quality ratings were managed by smaller construction companies or companies with little or no experience in building North American-style 2x4 homes.

The results of the construction cost assessment and the technical assessment indicate that technical training seminars should focus on the following areas:

- rough framing techniques and lumber specification
- construction detailing
- specification of imported building materials

- exterior finish details
- interior finish details
- insulation and energy efficiency details
- construction management and planning
- architectural design and details

Another important consideration in the design of a technology transfer program relates to the long-term maintenance of 2x4 homes in Japan. In order to ensure that North American-style 2x4 homes built in Japan provide the long-term performance that is expected of them, a strategy must be developed to ensure that they receive routine maintenance. It is critical that routine maintenance services be provided, whether by the homeowner, the building contractor, or an independent maintenance contractor.

Finally, some sort of independent certification of North American-style 2x4 homes built in Japan should be considered. The certification process could focus on the structural components of the home or could be extended to include the routine maintenance of the home as well. A certification program would not only ensure that North American-style 2x4 homes are built using the correct construction techniques but it could provide a forum to facilitate the provision of technical training programs in Japan.

It is critically important, from the US perspective, that the structural integrity of North American-style 2x4 homes in Japan is not compromised by the incorrect application of North American-style 2x4 construction technology. From a long-term strategic market development perspective, it is imperative that Japanese builders and carpenters be properly trained in 2x4 construction technology in order that the growth of this important segment of the Japanese housing market not be jeopardized by substandard product performance.

Given the Japanese expectation of high quality, the long-term growth potential of the 2x4 market is dependent on maintaining the quality of the North American-style 2x4 houses being built in Japan. From a marketing perspective, the role of quality is more important than low price in Japan and every effort should be made to ensure that the North American-style 2x4 construction technology is implemented correctly by Japanese contractors and carpenters. Failure to ensure the correct transfer of North American-style 2x4 construction technology would contribute to a perception by Japanese home buyers that 2x4 housing is poor quality, and would undermine efforts by North American companies and industry associations to further develop this growing segment of the Japanese housing market.

Over the long-term it is equally important that US value-added manufacturers and exporters work to gain greater acceptance of US wooden building materials in the other segments of the Japanese housing industry: post-and-beam and pre-fabricated housing. This includes learning how building materials are specified, by whom, what factors affect the specification process, and how to influence the specification process effectively to increase the use of US building materials in these segments of the Japanese residential construction industry. Similarly, it is equally important that US exporters better understand the role of maintenance and product support factors (*e.g.*, local inventory, product installation instructions and support services, and product maintenance literature) on the competitiveness of US building materials in Japan. Other factors such as product distribution and product support affect the overall success and acceptance of North American-style 2x4 projects, although these were not a part of the terms of reference of this project.

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