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Taiwan

Solid Wood Products

Fire Tests Close to Completion, Final Step to Complete Wood Building Code

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Report Highlights:
Update on ongoing revisions to Taiwan's fire code that, once complete, will permit normal financing and insurance of wood / timber frame construction and open significant market opportunities for structural wood, lumber and wood frame home peripheral / supporting products.

Includes PSD Changes: No
Includes Trade Matrix: No
Unscheduled Report
Taipei ATO [TW2]
[TW]

Taiwan's Architecture and Building Research Institute (ABRI) has scheduled structural soundness tests for structural glued-laminated (glulam) in January 2006. This represents the final technical step in Taiwan's nearly 5-year road to implementing a new building code that will, for the first time, be equipped to approve buildings up to 3 stories constructed with wood beams, dimension lumber, and glulam as main structural members.

The USDA's Agricultural Trade Office, the State of Idaho and the State of Washington, in cooperation with the Engineered Wood Association (APA) and other US industry associations, have been working over the past 5 years to facilitate revisions in Taiwan's building codes to permit not only stick frame (2x4 type frame construction) but also timber and glulam construction. While dimension lumber is a commodity and can be supplied to general standards by many countries, engineered wood used for structural purposes (mainly glulam, but also such products as timber strand) is a relatively sophisticated manufactured product for which the United States is a particularly competitive supplier. Therefore, in addition to seeing a new code permit structural wood use in general, US industry was particularly interested to ensure that Taiwan's revised structural regulations specifically permitted engineered wood applications.

Unlike stick frame construction, large beam (including glulam) construction most often leaves beams exposed as an aesthetic component of the building's interior. There are hundreds of thousands of excellent examples of exposed beam construction around the developed world – from single homes with exposed wood posts in the interior to office buildings, libraries, government offices, etc., where exposed wood is used to both purposeful and visual effects.

However, also unlike stick frame construction – in which wood members are almost always covered by other materials (such as plasterboard, plywood, tile, etc.), structural members in large beam construction must be able to maintain effective structural soundness during a fire in order to allow occupants adequate time to escape. In order to comply with fire rating requirements (e.g., 1-hour, 2-hour fire integrity), stick frame construction uses fire rated sheathing and wall materials to create an appropriate firewall between dimension lumber and any fire. Glulam and other beams have no such protection (unless they were similarly encased – to usually disappointing aesthetic affect). Fortunately, the United States and other countries, mostly during the 1970s and 1980s, conducted fire rating tests and research on glulam beams which created a scientific basis for estimating and designing in a fire rating for glulam beams. The United States and other countries today use straight calculation tables in order to determine the additional glulam width and depth dimensions necessary to allow a loaded structural beam to maintain integrity up to a required fire rating.

As part of Taiwan's ongoing efforts to bring domestic construction standards into line with international norms, the Architecture and Building Research Institute, a government research institute under the Ministry of the Interior, was tasked in 2000 to conduct a full review of Taiwan's building code and develop supporting regulations and reference manuals to permit. The ATO, APA, and State of Idaho, in particular, were actively involved in providing data and documentation required by ABRI. A significant portion of the new wood regulations were adapted directly from material supplied by APA and the AF&PA.

The new building code and related wood manual were provided in draft form to US industry for comment and formally approved and promulgated in May 2003, albeit without a fire code.

US industry's concerns that an exposed beam component be included in Taiwan's regulations stopped the fire code process due to a confidence gap between US industry and Taiwan regulators. Without practical experience using glulam and concerned regarding how Taiwan architects and builders would treat the material, ABRI requested specific information

regarding glulam fire resistance and performance under fire. ATO and APA held a series of technical meetings with ABRI and CPA (as well as architect and builder associations) in Taiwan to lobby on behalf of Taiwan adopting fire-rating calculation formulae directly. After over a year of effort, it was clear that tests would need to be run. The ABRI had just completed a modern burn test facility and was eager to run a long series of glulam tests to examine performance under many conditions and load factors. Concerned about the time and expense this would incur, ATO and APA lobbied – eventually successfully – for an ABRI commitment to run calculation formula "confirmation tests". The first, at APA's invitation was held at a US laboratory in Texas in August 2004. ATO invited three key individuals from ABRI, CPA and the Tainan fire lab. Two tests were run at the US lab under Taiwan team supervision. Results were provided and questions answered.

Technical and scheduling problems for Taiwan's fire testing have delayed the glulam tests in Taiwan well past their initially planned date in early 2005. However, the scheduling for January 2006 represents the last technical issue to be overcome in completing the "confirmation tests" that will allow an effective fire code to be included in Taiwan's wood frame structural code and technical manual. Once completed, ATO is hopeful that regulatory officials can review and approve the fire code draft (already written) by early 2Q 2006.

Benefits: An effective fire code will represent a significant step forward for Taiwan's wood construction industry which, until, operates without a comprehensive system of review and approval. Although the technical manual has been approved and has operated for nearly two years, it covers construction issues only. Without a fire code, fire inspectors are unable to approve structures built of wood. For individual, wealthy homeowners, the difference is not significant. However, for much of the potential market, the difference is great. Without approved fire certification, a building is not eligible for insurance at competitive rates (thus, Taiwan architects are largely unwilling to use wood in office buildings, school and public structures, theaters, etc.) or for financing (thus, wood is rarely used in real estate developments or for middle class / moderate income housing). This barrier to the natural growth of wood in construction has continued to place wood at an unfair disadvantage to competing materials (mostly reinforced concrete and structural steel) and represents potentially great losses to suppliers of structural wood as well as suppliers of the myriad supporting products that go into wood frame buildings.

The Agricultural Trade Office will continue to work with Taiwan authorities and US industry to ensure that the process of normalization in the domestic construction market continues to progress at a steady rate. With a supportive regulatory environment, Taiwan opportunities should expand and the market will be highly receptive to such market development initiatives as technical education seminars, materials promotions, collaborative showcase project developments and so on.