PROPOSAL to CORMA for the Development of a Building Code & Guide for the Construction of Wood-frame Housing in Chile

submitted by the

BCIT®
BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY A POLYTECHNIC INSTITUTION

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Executive Summary

In November of 2003, CORMA, the Chilean Wood Association invited BCIT to Chile to Santiago to meet with a number of educational institutions and industry associations to discuss opportunities to work in cooperation with them in the transfer of wood-frame construction technologies to Chile.

In April of 2004, BCIT was invited by CORMA to return Chile to conduct a needs assessment and provide recommendations with respect to increasing Chile's capacity to utilize wood-frame construction technologies, thereby providing them with an opportunity to build safe, durable and efficient housing to meet their increasing housing demand, and at the same time utilize Chilean lumber resources for this purpose. BCIT worked in cooperation with the Chilean Wood Corporation to complete a technology transfer and training needs assessment, including strategy and recommendations, as relates to the use of wood-frame construction technologies in Chile.

Upon completion of the needs assessment, BCIT provided the following recommendations:

- Deliver wood-frame construction "Professional Development Workshops" to Chilean government officials and to senior members of the construction industry.
- Develop and/or adopt wood-frame construction standards and building codes.
- Design training programs that will meet the needs of the wood-frame construction industry in Chile. These certified wood-frame programs should include construction technologies, supervision, quality assurance/inspection and design.
- Provide training for Chilean educators in the use of wood-frame construction technologies.
- Procure and/or develop wood-frame construction curriculum and educational delivery systems of an international standard. This curriculum should be competency based and include applied practical components.
- Establish a "Wood-Frame Construction Centre of Excellence" in Chile.
- Provide assistance and on-going support for evaluation and accreditation of wood-frame construction training and technology transfer programs in Chile.

These training and technology transfer recommendations will play a vital role towards ensuring the successful adoption and use of wood-frame construction practices in Chile. Implementation of the above noted recommendations will provide the following benefits in Chile:

- Increased capacity to construct safe, durable, energy efficient, sustainable and affordable structures
- Expanded use of Chilean natural resources
- Increased economic activity
- Increased vocational and technical skills training for the workforce
- Expanded export opportunities

This proposal is being submitted with respect to the development of a wood-frame building code and a wood-frame guide which would allow for the construction of wood-frame homes in Chile.
In addition, we believe BCIT can provide:

- Significant project experience in the construction sector worldwide and in-depth knowledge of the specific technologies and latest developments in construction materials and processes.
- Extensive experience in needs assessment, curriculum development, classroom and on-site training, and program delivery.
- Over 20 years of success in providing international training and technology transfer programs.

**Proposed Project Staff**

**Mr. Wayne Stevens**
Director, Canadian Housing & Construction Centre

Mr. Wayne Stevens has more than twenty-five years experience in the construction industry and is a specialist in residential wood-frame construction. In his current position as Director for the BCIT Canadian Housing & Construction Centre, he works in cooperation with governments and industry, both locally and internationally, in the delivery of training and technology transfer programs for the construction sector.

Previous projects have included Home 2000, a housing demonstration project in cooperation with the Canada Mortgage and Housing Corporation, delivery of numerous professional development workshops to various international delegations, working in cooperation with the Homeowner Protection Office in education and training, and the delivery of seminars and workshops to the construction sector in cooperation with numerous industry associations, including the Canadian Home Builders’ Association of BC.

Other Canadian Housing & Construction Centre projects include:

**Canadian Wood-Frame Construction – Technology Transfer (Brunei Darussalam)**
- At the request of the Canadian High Commission in Brunei Darussalam, BCIT was requested to meet with various government officials to discuss the opportunities to utilize Canadian wood-frame construction technologies in the revitalization of Kampung Ayer, the largest water village in SE Asia. These discussions resulted in BCIT being requested to submit recommendations with respect to the use of wood-frame construction technologies for use in the construction of both a tourism centre and a cultural centre to be constructed in Brunei.
- BCIT is now working in cooperation with the Ministry of Development to implement a program which will provide for the transfer of technology as relates to the use of wood-frame construction practices.

**Canadian Construction – Training & Technology Transfer (India)**
- Worked in cooperation with Maradadi Pacific and the Somaiya Group on a needs assessment and the development of a strategy with respect to technology transfer and training for the construction sector in India.
Canadian Wood-Frame Construction – Training & Technology Transfer (China)
- Working in cooperation with the Council of Forest Industries, the Shanghai Construction and Management Commission – Science and Technology Committee and the Shanghai Real Estate Education Centre to deliver a series of Professional Development Workshops, develop curriculum and deliver an instructor training program to assist China adopt the use of wood-frame construction.

Canadian Wood-Frame Construction – Training & Technology Transfer (Taiwan)
- Working in cooperation with the Council of Forest Industries in the delivery of a series of wood-frame construction presentations in Taiwan. These were delivered in Taipei in cooperation with the National Taipei University of Technology and in Kaohsiung with the Zhen Xiu University of Technology. Upcoming activities include the delivery of professional development workshops.

Training/Technology Transfer Needs Assessment for the use of wood-frame construction technologies in Shanghai, PRC.
- Worked in cooperation with the Council of Forest Industries and the Shanghai Construction and Management Commission – Science and Technology Committee to provide a Needs Assessment and a series of recommendations to assist China adopt the use of wood-frame construction.

Professional Development Workshops for the China Hebei Academy of Engineering Consulting
- Delivered a series of workshops covering a range of topics including development of large commercial projects, sewage treatment, worker safety, construction engineering practices, residential construction, and the various codes used by the construction industry.

Professional Development Workshops for the Liaoning Shiji Development Company
- Delivered a series of workshops covering a range of topics including real estate licensing, market trends, market development, property management, building maintenance, leasing, single and multi-family construction and mortgage financing.

Building Construction Program, Institute for People Development, Kota Kinabalu, Malaysia
- Reviewed existing construction training program
- Conducted a training needs assessment including a job/task analysis
- Used the DACUM technique to develop a new curriculum
- Provided opportunities for staff and faculty development
- Provided technical assistance in the design, construction and equipping of a new training facility in Malaysia.

British Columbia Homeowners Protection Office
- Conducted an educational needs assessment for the residential construction industry in British Columbia

Canadian Home Builders’ Association of BC
- Revised the “Certified Residential Builder Program”
- Delivery of the Building Envelope Solutions Course
Canada Mortgage and Housing Corporation (CMHC)

- Partnered with CMHC in the Home 2000 project, a housing demonstration project located on our Burnaby Campus
- Delivering a number of specialized housing related training programs.
- Certified Instructor for the Builders’ Workshop Seminars

Natural Resources Canada

- Certified Instructor for the R-2000 Program and the Quality Plus Seminars
- Delivered programs throughout British Columbia

National Building Code of Canada

- Developed the Commentary to Part 9 of the National Building Code of Canada

Canadian National Rail

- Employee skills assessment

Ms. Maite Bravo-Gagnon, IA (AIBC), MRAIC

Maite obtained her degree of architect with honors from the Faculty of Architecture and Urban Planning, University of Chile. While earning her degree at the University of Chile Maite received numerous awards and scholarships. Maite has worked in cooperation with a number of architectural firms in Chile including Iglesi- Prat Architects, Tarco Architecture and Ubach-Mayo Architects. In addition Maite assisted in the delivery of numerous courses at the Faculty of Architecture and Urban Planning, University of Chile.

Since coming to Canada Maite has been working with the BCIT School of Construction and the Environment. Her experience at BCIT includes Project Assistant for the “Green Roof Research Facility”, Assistant Instructor for “Architectural Graphics” and “Planning” courses, Instructor for the “Architectural Graphics” course, and is currently working as an Assistant Instructor for the “Architectural Drafting and Design Program”, a program that specializes in wood-frame construction techniques. Her training as an architect in Chile, along with her more recent wood-frame construction experience in Canada should prove to be a valuable asset to this project.

Proposed Project Activities

Development of a wood-frame building code

BCIT will work in cooperation with CORMA and the Chilean Ministry of Housing to develop a comprehensive wood-frame building code for use in Chile. This code would apply to all single, detached, semidetached and row-housing types (as well as their ancillary garages) that are site-assembled, manufactured or factory-built, provided they are of three storeys or less in building height and have a building area not exceeding 600 m2 (6,460 ft.²). Please see sample code in Appendix A.
Development of a wood-frame building guide

BCIT will work in cooperation with CORMA and the Chilean Ministry of Housing to develop a comprehensive wood-frame building guide. The guide would be based on the code and through the use of text and graphics would provide a more comprehensive understanding of the wood-frame building code. Please see sample guide in Appendix B.

Presentation of completed documents

Once the code and guide have been completed BCIT will attend a formal presentation, at which time the documents will be delivered to government officials and industry stakeholders in Chile.

Impact

The technology transfer activities as outlined in this proposal will play a vital role towards ensuring the successful adoption of wood-frame construction practices in Chile.

This project will significantly expand the capacity of the Chilean construction industry to successfully utilize wood-frame construction in many of their construction projects. This will result in the following:

- *Increased capacity to construct safe, durable, energy efficient, sustainable and affordable structures in Chile.*
- *Expanded use of Chilean natural resources*
- *Increased economic activity*
RESUMEN EJECUTIVO

En noviembre de 2003, CORMA, invitó a Chile a la BCIT (British Columbia Institute of Technology) Un instituto politécnico que incluye el “Canadian Housing and Construction Centre”. A fin de prospectar oportunidades de trabajo conjunto en la transferencia de tecnologías en la construcción en madera, reuniones que se llevaron a cabo con empresas de la industria e instituciones educacionales.

En abril de 2004, BCIT vino a Chile, a conducir un seminario de necesidades y recomendaciones respecto a la creciente capacidad nacional para utilizar madera en construcción, a fin de asegurar viviendas eficientes, seguras y duraderas, utilizando recursos naturales renovables.

En conjunto con Corma, BCIT, desarrolló un completo programa de transferencia tecnológica y necesidades de capacitación, incluyendo recomendaciones y estrategias.

Las recomendaciones fueron las siguientes:

- Realizar “Talleres de Desarrollo Profesional”, a funcionarios de la industria y de organismos fiscales.
- Actualizar normas y código de construcción
- Implementar programas de capacitación, con certificación, que incluyan diseño, tecnologías, supervisión, inspección y control de calidad.
- Entrenar y actualizar a los profesores en el uso de tecnología de construcción en madera.
- Desarrollar planes y programas para la educación, que cumplan con estándares internacionales
- Fundar un “Centro de excelencia para la construcción en madera”
- Proveer asistencia y apoyo para la evaluación y acreditación de planes y programas para la educación y transferencia de tecnologías para el uso de la madera.

Estas recomendaciones tienen por objetivo lograr:

Estimular el uso de madera en construcción. Aumentar el uso de madera en el mercado interno.

Mejorar las capacidades para construir estructuras seguras, duraderas, energéticamente eficientes, sustentables y a un valor razonable.

En este marco Corma propone comenzar con la incorporación de nuevas tecnologías al “Código de construcción” y su correspondiente “Guía de uso”, para lo cual quiere contratar los servicios de consultoría a la BCIT de Canadá.