Developing a Wood Culture for Non-Residential Construction

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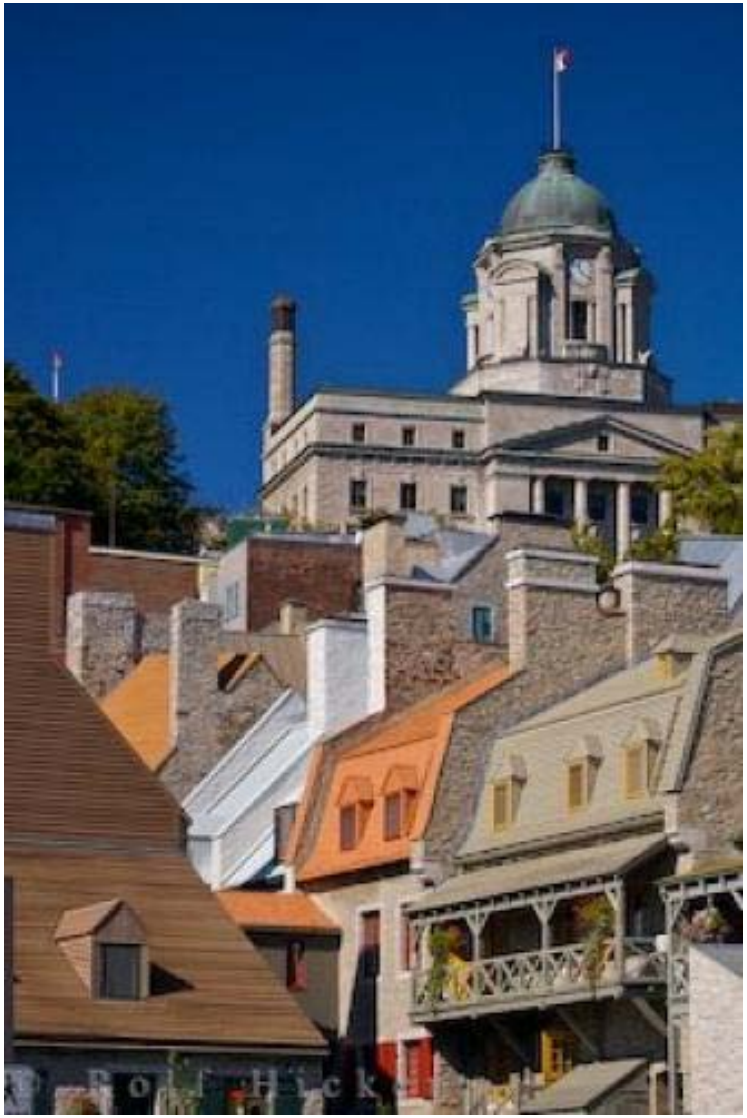

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Background

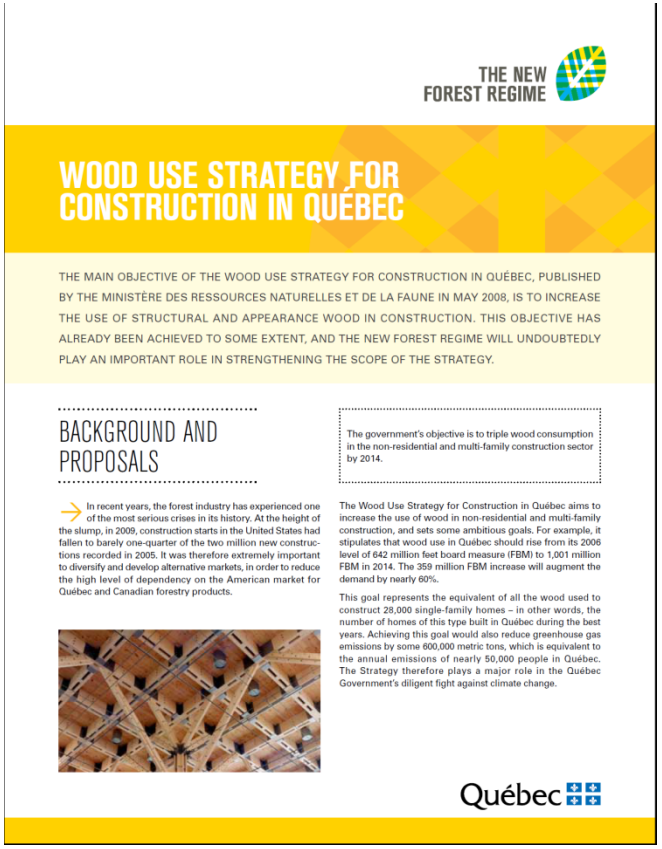
- Very little use of wood as construction material for non-residential buildings in Eastern Canada until recently;
- Steel and concrete are mostly used;
- Markets for Canadian lumber shrinked importantly since 2006. The development of new utilizations of wood is becoming strategical to maintain this industry;
- Governmental policies were put in place in 2008 to favor the use of wood for non-residential buildings;
- Laval University has been active over the last 10 years in promoting the use of wood in non-residential construction.

Objectives

1. Describe the Quebec Government policies to promote the use of wood in non-residential construction;

2. Describe the actions of Laval University to promote the use of wood in non-residential construction.

Methods Used to Promote Wood as a Construction Material



THE NEW FOREST REGIME

WOOD USE STRATEGY FOR CONSTRUCTION IN QUÉBEC

THE MAIN OBJECTIVE OF THE WOOD USE STRATEGY FOR CONSTRUCTION IN QUÉBEC, PUBLISHED BY THE MINISTÈRE DES RESSOURCES NATURELLES ET DE LA FAUNE IN MAY 2008, IS TO INCREASE THE USE OF STRUCTURAL AND APPEARANCE WOOD IN CONSTRUCTION. THIS OBJECTIVE HAS ALREADY BEEN ACHIEVED TO SOME EXTENT, AND THE NEW FOREST REGIME WILL UNDOUBTEDLY PLAY AN IMPORTANT ROLE IN STRENGTHENING THE SCOPE OF THE STRATEGY.

BACKGROUND AND PROPOSALS

In recent years, the forest industry has experienced one of the most serious crises in its history. At the height of the slump, in 2009, construction starts in the United States had fallen to barely one-quarter of the two million new constructions recorded in 2005. It was therefore extremely important to diversify and develop alternative markets, in order to reduce the high level of dependency on the American market for Québec and Canadian forestry products.

The government's objective is to triple wood consumption in the non-residential and multi-family construction sector by 2014.

The Wood Use Strategy for Construction in Québec aims to increase the use of wood in non-residential and multi-family construction, and sets some ambitious goals. For example, it stipulates that wood use in Québec should rise from its 2006 level of 642 million feet board measure (FBM) to 1,001 million FBM in 2014. The 359 million FBM increase will augment the demand by nearly 60%.

This goal represents the equivalent of all the wood used to construct 28,000 single-family homes – in other words, the number of homes of this type built in Québec during the best years. Achieving this goal would also reduce greenhouse gas emissions by some 600,000 metric tons, which is equivalent to the annual emissions of nearly 50,000 people in Québec. The Strategy therefore plays a major role in the Québec Government's diligent fight against climate change.

Québec

Wood Use Strategy for Construction in Québec

Published in 2008;

Objective: Increase the use of wood for structural and appearance products in non-residential and multi-family construction by about 60% from 2006 to 2014;

Courses of action:

1. The Quebec Government should lead by example using wood in its own buildings. Wood must be considered in all public building constructions in Quebec now;
2. Support innovation, develop tools to support designers and develop a wood culture in Quebec;

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Methods Used to Promote Wood as a Construction Material

Beaulieu Commission

- Launched in 2011, report submitted in February 2012;
- Objective: Enquire on the reasons explaining the slow development of non-residential wood construction and recommend measures to correct the situation;
- Recommendations:
  1. Improve availability of documentation, design tools, technical support and training for engineers and architects;
  2. Improve training programs on the use of wood for non-residential construction at high school, technical school and university levels;
  3. Make timber construction course mandatory for civil engineering students;
  4. Improve continuing education on wood construction;
  5. Develop research chairs.

Methods Used to Promote Wood as a Construction Material

Showcase projects at Laval University

- Gene-H.-Kruger Building
- TELUS Stadium
- Montmorency Forest Wood Bridge

Gene-H.-Kruger Building

- Opened in October 2005;
- Home of the Wood Research Centre;
- Used for teaching and research in wood science and engineering; at the undergraduate and graduate levels;
- 8000 m^2 of usable space;
- 18 laboratories, 3 classrooms, one conference room of 100 persons capacity, one meeting room of 20 persons capacity, offices for Faculty members, postdoctoral fellows, graduate students, support staff;
- Structure made of black spruce and Douglas fir glulam beams. Manufacturer is Nordic Engineered Wood;
- Exterior siding, windows and interior wall panels made of wood and wood-based panels.

Gene-H.-Kruger Building

Main entrance

Back entrance

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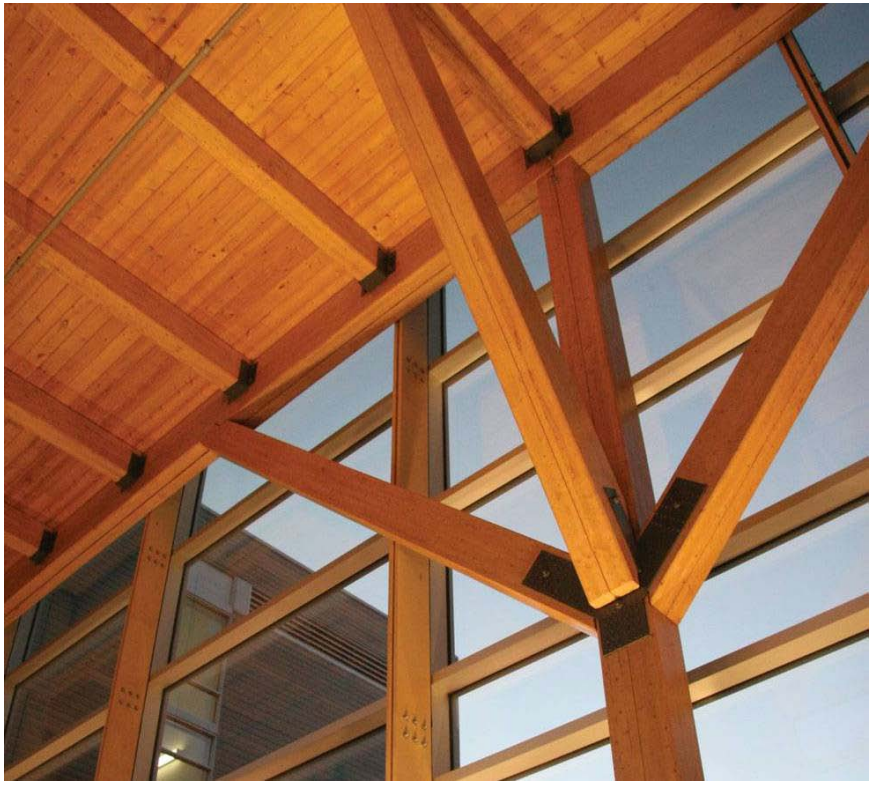
Gene-H.-Kruger Building

Hallway



Wood structure

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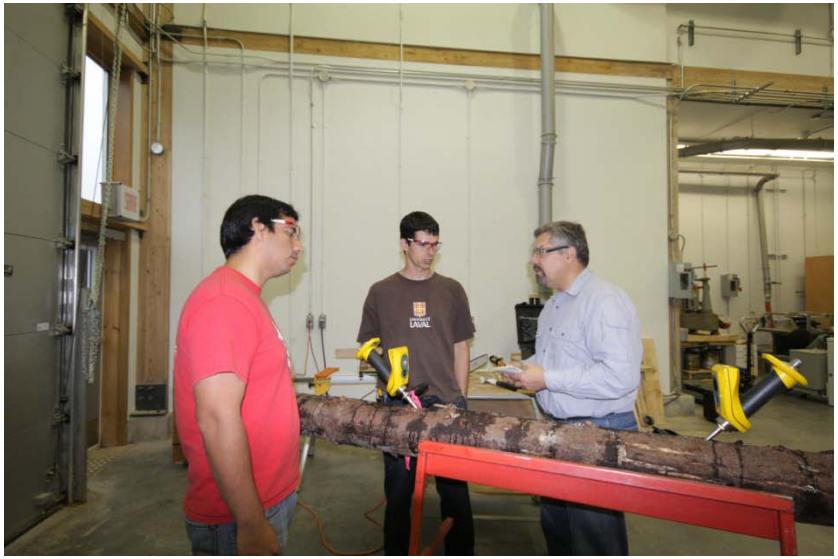
Gene-H.-Kruger Building

Conference room



Laboratory

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TELUS Stadium

- Opened in January 2012;
- Used for soccer, rugby and football;
- Field has a size of 60 m x 100 m;
- Main structure made of 13 black spruce glulam arches of 72 m span installed at 9 m interval. Manufacturer is Nordic Engineered Wood;
- Steel bars are also used in the structure forming a hybrid structure;
- Black spruce from northern Quebec with particularly slow growth, small knots and high mechanical properties is used in the main arches;

TELUS Stadium

Location on campus

Main entrance

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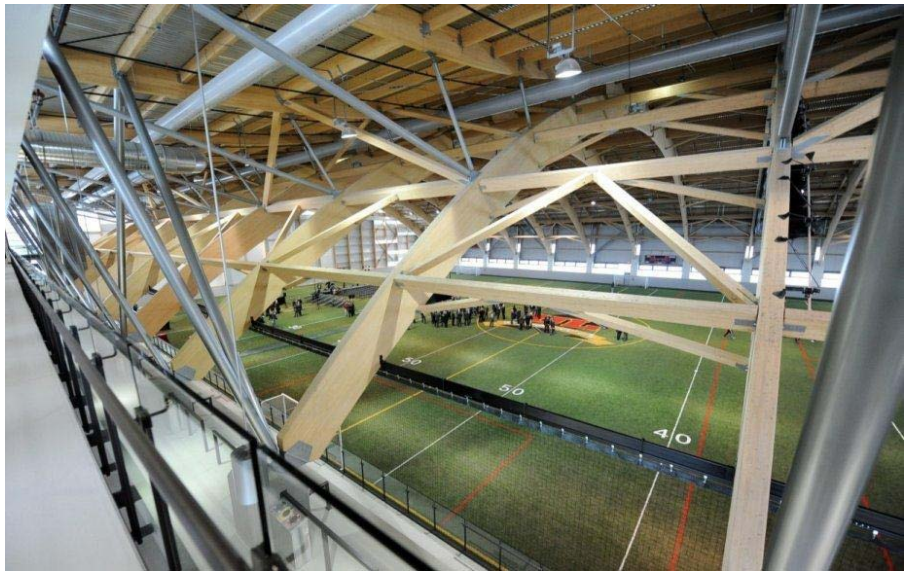
TELUS Stadium



Hybride structure

Hybrid structure under construction

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TELUS Stadium

Assembly and installation of main arches

Glulam connectors to concrete base

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Montmorency Forest Wood Bridge

- Opened in June 2011;
- Montmorency Forest is Laval University forest experimental station located 75 km north of Quebec City.
- Area of 6664 ha used for teaching, research and recreation;
- Wood bridge used to cross the Montmorency River, a tributary of the St-Lawrence River;
- Bridge has a 44 m span and a width of 4.8 m;
- 12 glulam arches and 10 glulam beams made of black spruce from northern Quebec. Manufacturer is Nordic Engineered Wood;
- Built and installed on the principle of a carbon neutral project: 1941 trees were planted on the Montmorency Forest territory to compensate the balance of 129.4 tons of CO_2 emitted in this project.

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Montmorency Forest Wood Bridge

Completed bridge

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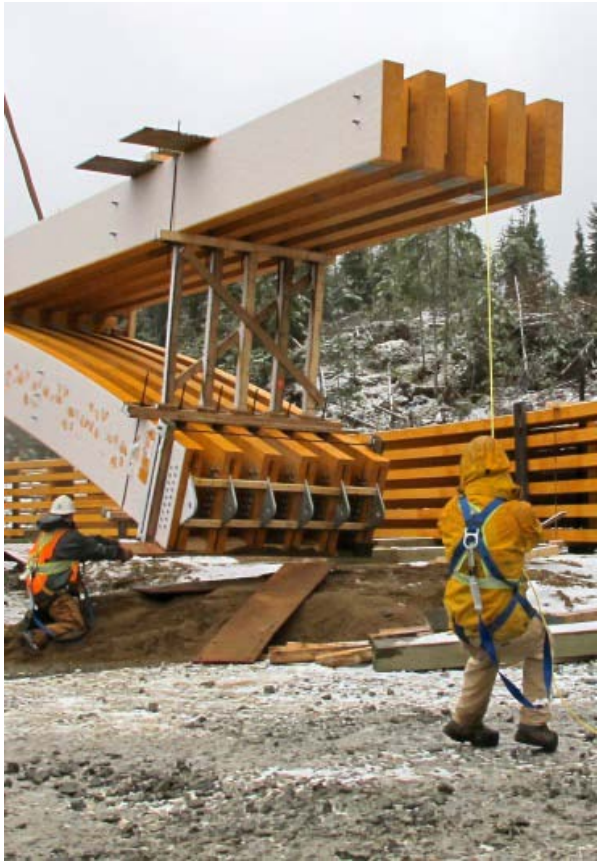
Montmorency Forest Wood Bridge

Installation of bridge section



Installation of bridge section and connectors

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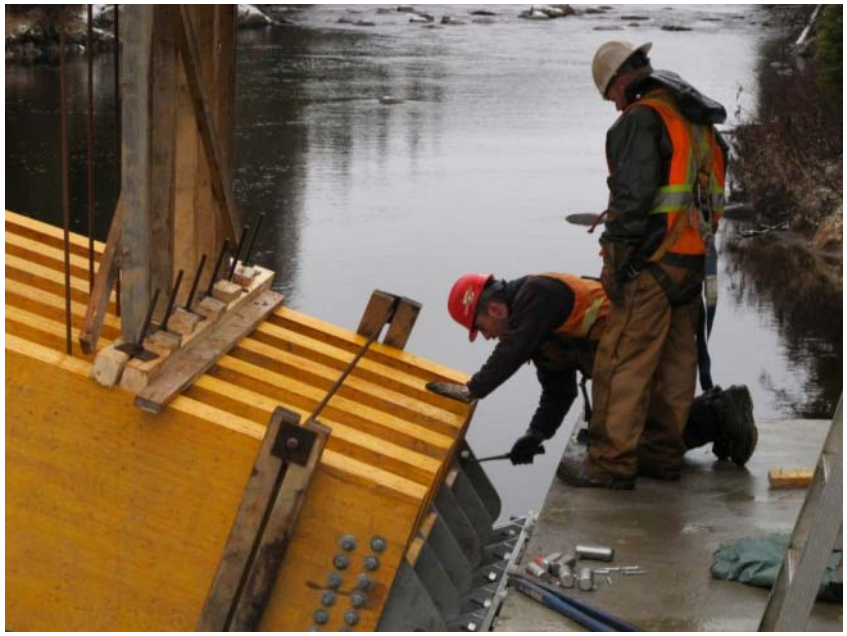
Montmorency Forest Wood Bridge

Installation of bridge section and connectors to concrete base



Installation of connectors to concrete base

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Conclusions

1. Significant efforts are currently made in the Province of Quebec, Canada to develop a wood culture in the area of non-residential construction.
2. Progress were made and interesting showcase projects were realized at Laval University, elsewhere in Quebec and elsewhere in Canada such as FPInnovations laboratories in Quebec City and Vancouver, and the Faculty of Forestry at the University of British Columbia;
3. More work remains to be done to insure a faster development of wood construction in the Province of Quebec: Development of tools and documentation on wood construction for engineers and architects involved in these projects, better training programs at the technical and professional levels, and pursue research in the areas of wood-based products and wood construction.

Thank you!

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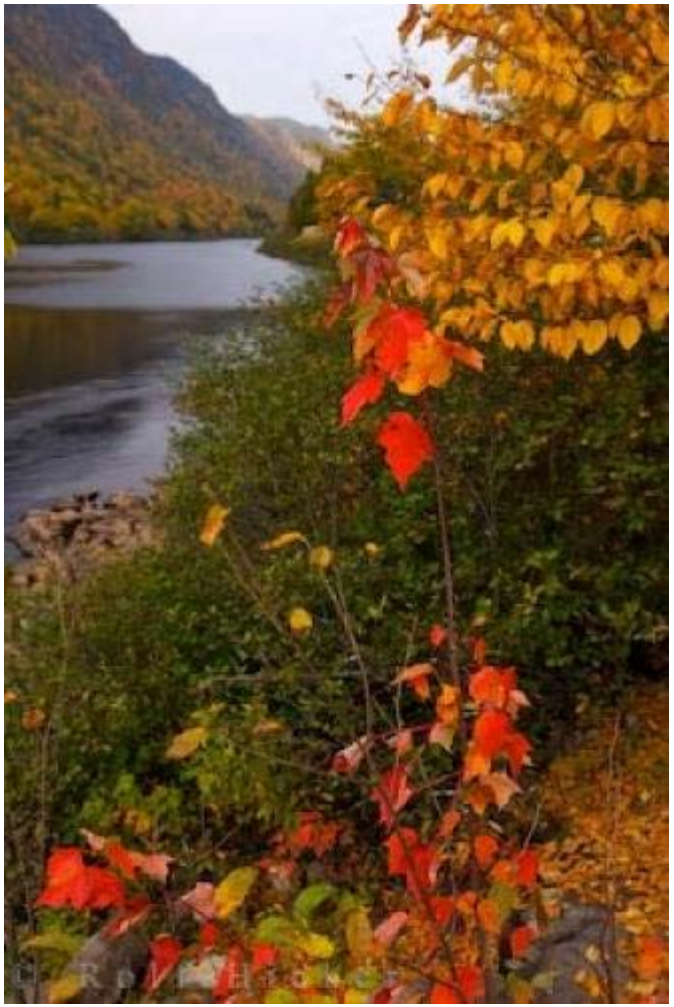

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