

**COST E55 Conference – 26-27 May 2011**

# Prospects and Challenges in Future Timber Engineering Research

**Pierre Quenneville**

**Professor and Head of Department**



# OUTLINE

- Introduction – *defining the future...*
- Prospects & Challenges  
*what, how...*
- Conclusions

- **prospect** anticipation; expectation; a looking forward.
- **challenge** something that by its nature or character serves as a call to a special effort.

## Introduction – *defining the future...*

*For the next 10-20 years, the timber industry will want to capitalize on its ability to penetrate the urban multi-storey market in some parts of the world.*

## *The urban multi-storey market...*

- multi-residential*
- commercial*
- mixed use*

## *The London Stadhaus*





*This means*

*- catching-up for some...*

*- pushing the limits for others...*



## Not covered in this presentation

- *bridges*



- *single-storey buildings (industrial, portal frames)*

- *special cases*



These types of structures will benefit from some of the research.

However, the bulk of the research effort will be targeted at the urban multi-residential.

# Prospects & Challenges

The big picture...

*Catch-up for some...*

*Prospects*

- *need to address regional peculiarities  
(cultural, technological)*

*Challenges*

- *Fire, durability, loadings*

## Challenges - Fire

*different levels of tolerance to fire threats*

*need to satisfy authorities and public*

- *test on different assemblies*
- *test on different scenarios*
- *educate...*

## Challenges - Durability

*more critical in humid environments*

*protection of fibres without  
compromising health issues*

- *economical treatments*
- *sustainable*

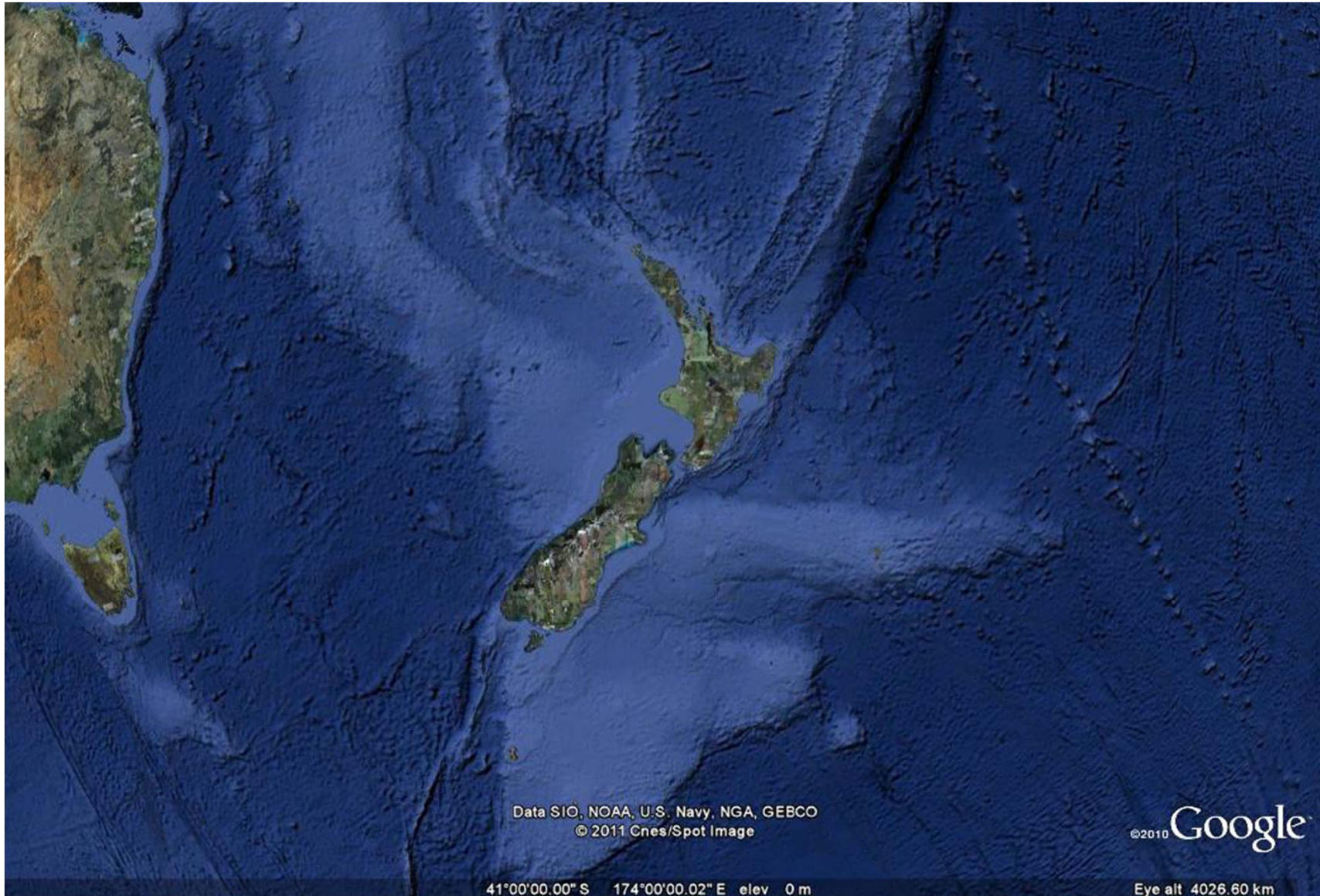
## Challenges – Loadings *specific to regions*

*earthquakes/wind resistant solutions  
will allow penetration of markets*

- *systems approach*
- *proprietary*

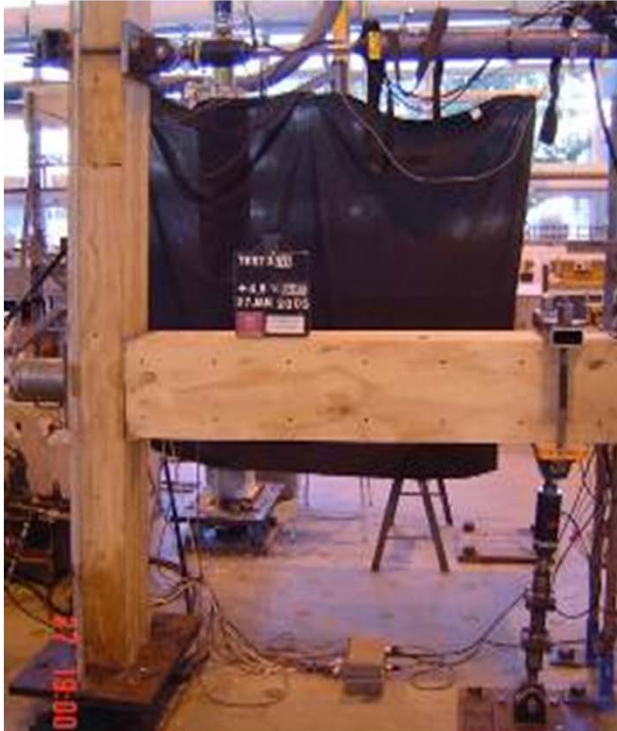




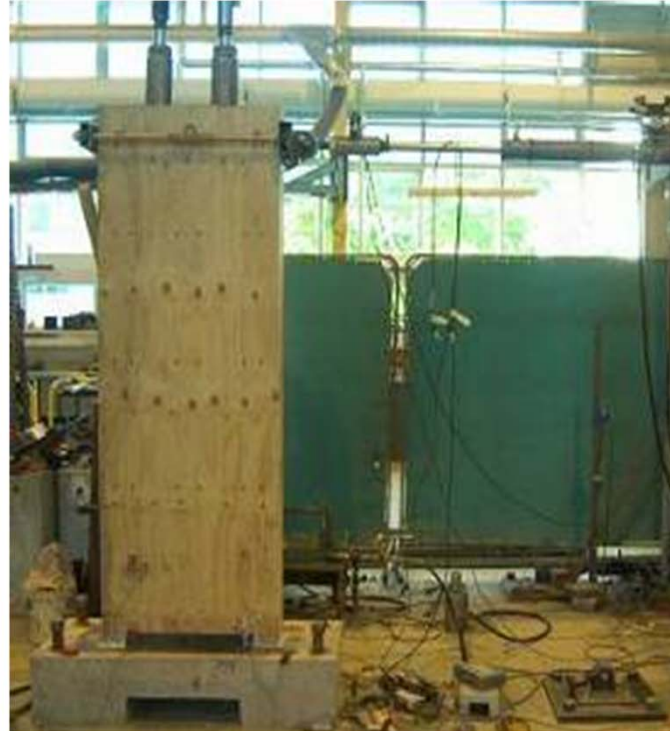








Frame



Wall



Column

University of Canterbury

## *EXPAN building tested at UC*



*Pushing the limits for others...*

## *Prospects*

- *Development of new materials, systems, tools*

## *Challenges*

- *Longer spans, simpler tools, quality in service*

## Challenges – Longer spans

*limits affect potential use of buildings*

*floor spans that can compete with  
other solutions*

- *integration of services*
- *use of high strength wood fibres*
- *hybrid concepts*



## Challenges – Simpler tools *for ease of implementation*

*Simplify implementation of the timber  
solution at all phases*

- *simple but accurate design tools*
- *pre-fabricated packages*

# Challenges – Quality in service *no compromise*

*Provide very high-quality visual,  
acoustic and vibration solutions*

- *damping solutions*
- *vibrations*

## Specific research areas

# Innovation areas - 1

## Connections

*Predicting the brittle failure modes or  
avoiding them*

## Innovation areas - 2

Controlling the fibre behaviour

*Shear and tension perp.*

*We need the next generation of  
advanced engineered wood products*

## Innovation areas - 3

“Welding” components together

*Not so much welding as in steel but the transfer of forces in a series of continuous small connections*

## Innovation areas – 4

Increasing the thermal mass potential  
of the timber components

*Technology is available. Timber could  
benefit from this.*

## How to respond to these Challenges ...

- *Concerted efforts*
- *Unification of standards*
- *Elimination of barriers*
- *Re-generation of the workforce*



Let us compete with steel and  
concrete...

## Conclusions

- Urban multi-storey buildings will continue to occupy the bulk of the R&D efforts
- Regional disparities will occupy some of the research efforts

Predicting the future is really impossible.

However, there are events that we know will happen ...

**WCTE** Auckland **2012**  
16 - 19 July  
World Conference on Timber Engineering



[www.wcte2012.com](http://www.wcte2012.com)

Questions, discussion ...