

University of Innsbruck / Timber Engineering Unit **holzbaulehrstuhl**  
 Universität Innsbruck

## Workshop 1

8th September 2011

To learn about energy standards and how to design advanced energy efficient building envelopes. Passive house principles and fundamentals on thermal, moisture issues, and air tightness will be covered

**Asst.-Prof. DI Dr. techn. Anton Kraller**

<p><b>Activities as a craftsman</b></p> <ul style="list-style-type: none"> <li>- apprenticeship as a joiner</li> <li>- lumberjack</li> <li>- journeyman joiner</li> <li>- master carpenter</li> </ul>	<p><b>Academic education</b></p> <ul style="list-style-type: none"> <li>- technical school for furniture design</li> <li>- study of architecture</li> <li>- doctor of technical sciences</li> </ul>
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2011 Wood Structures Symposium

2011 UMass Wood Structures Symposium

## Program – Workshop 1

1. Introduction 1:00 – 1:05 Anton Kraller
2. Sustainable Wood Construction Practices in Austria 1:05 – 1:30 Anton Kraller
3. Green Building Certification Systems / Energy Standard in US 1:30 – 2:00 Ludmilla Pavlova
4. Passive House Principles 2:00 – 3:00 Anton Kraller

Break 3:00 – 3:30


5. Detailing for Durability 3:30 – 4:30 Paul Fisette
6. Discussion Forum 4:30 – 5:00 Moderator Alexander C. Schreyer

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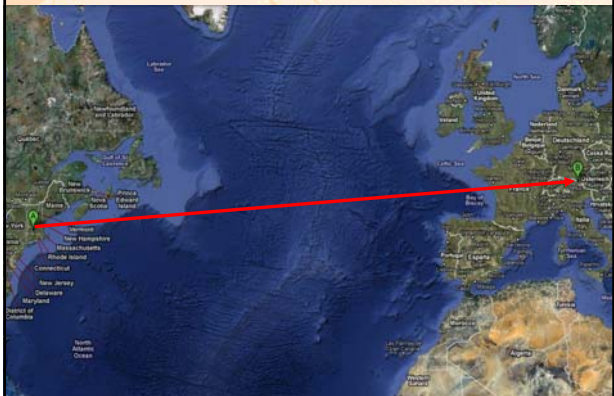
## Sustainable Wood Construction Practices in Austria

Asst.-Prof. DI Dr. techn. Anton Kraller



Workshop 1 – 2011 Wood Structures Symposium

## Massachusetts – Austria



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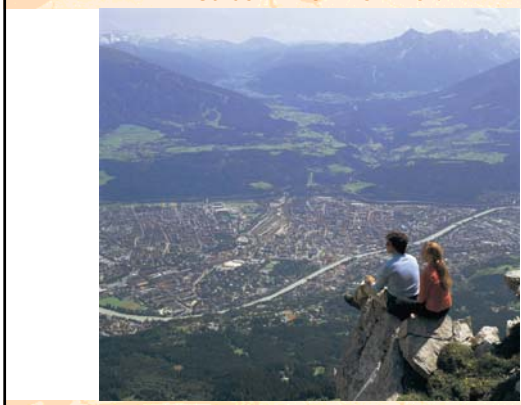
## Europe - Austria



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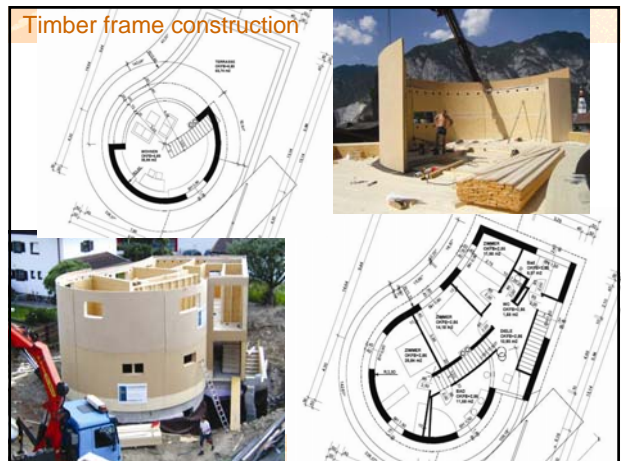
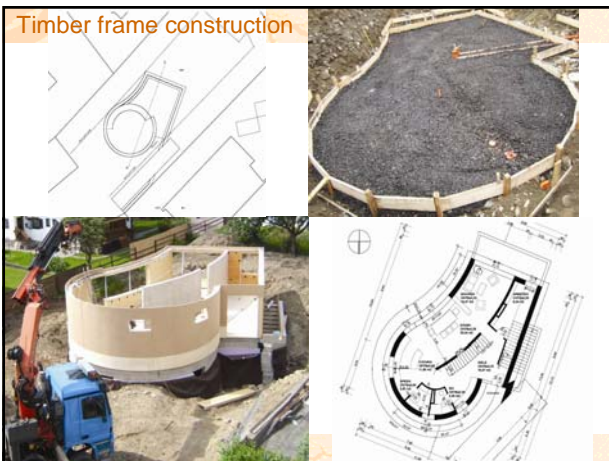
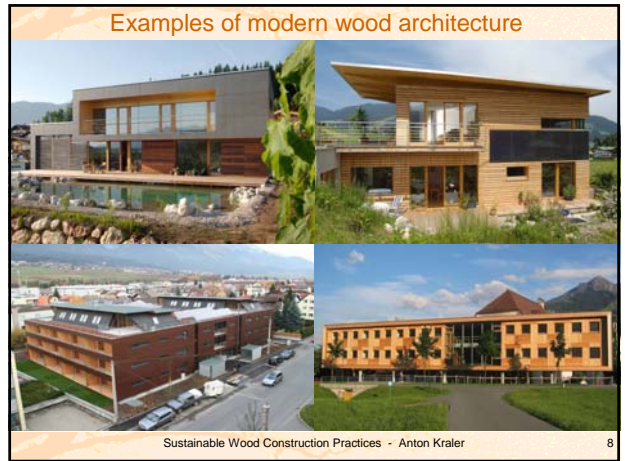
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## Innsbruck - View from north



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Timber construction systems

Timber frame construction

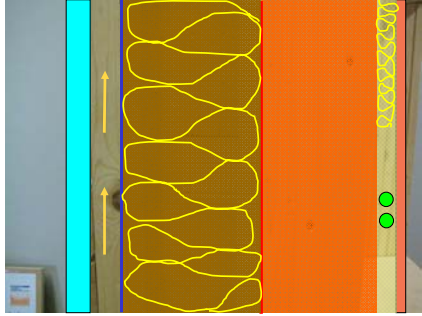


Single-family house

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Timber construction systems

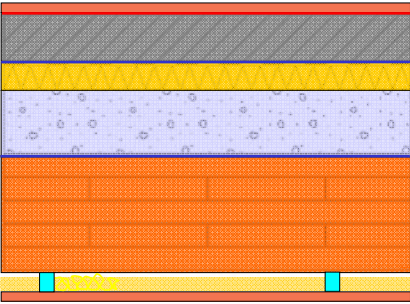
Detail: wall with solid wood or cross-laminated timber (CLT)



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Timber construction systems

Detail: ceiling board with solid wood or cross-laminated timber



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Timber construction systems

Solid wood construction



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Timber construction systems



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Timber construction systems



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**Timber construction systems**


Room cells – modular construction with CLT



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**Timber Construction Systems**


Interior of room cells



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**Timber Construction Systems**

Modular construction



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**Timber construction systems**

Connectors for the shear force




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**Timber construction systems**

Exterior view

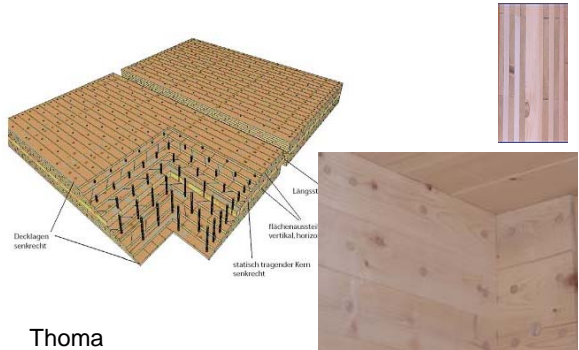
Social - center



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**Timber construction systems**

Cross laminated timber (CLT) without glue



Thoma

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### Requirements for timber construction systems

- Wood Protection
- Moisture Protection
- Fire Protection
- Sound Insulation
- Heat Protection

**Airtightness**

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### Hybrid: solid wood and timber frame construction

#### Detail – Party Wall, Ceiling and Exterior Wall

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### Comparison of low energy house – passive house

#### Typical U-Values in W/(m²K) in Austria

Component	NEH (Low Energy House)	PH (Passive House)
Dach (Roof)	0,15-0,25	≤ 0,15
Fenster (Window)	1,2	≤ 0,8
Wand (Wall)	0,20-0,30	≤ 0,15
Bodenplatte (Floor slab)	0,30-0,35	≤ 0,15

Quelle: R. Pösl

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### Typical thermal insulation for timber construction

#### Wooden softboard

10 in – 15 in for U - Value 15kW/m²K

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### Typical thermal insulation for timber construction

#### Cellulose

10 in - 14 in for U - Value 15kW/m²K

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### Typical thermal insulation for timber construction


#### Mineral wool

9 in - 11 in for U - Value 15kW/m²K

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Typical thermal insulation for timber construction

Sheep's wool

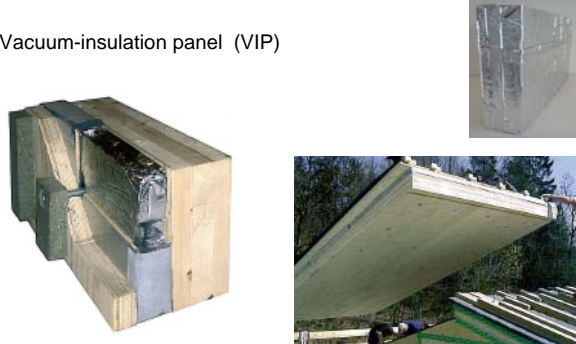


10 in - 14 in for U - Value 15kW/m²K

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Special thermal insulation for timber construction

Vacuum-insulation panel (VIP)



2 in for U - Value 15kW/m²K


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Important factors for timber construction systems

Sound insulation

Air tightness

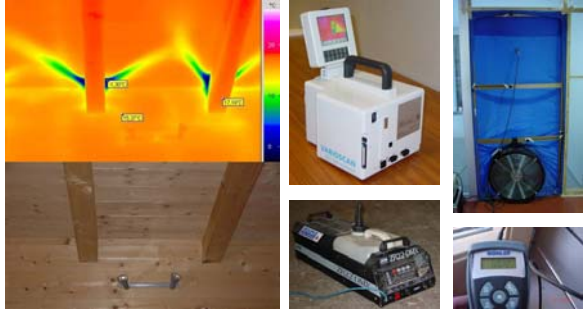
Quality assurance



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Quality assurance

Blower Door and Thermography measurements



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Quality assurance

Moisture measuring device

Fractometer tests

Ultrasonic testing equipment

Bending test

Drill resistance measuring device

Hardwood core drill



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Thank you for your attention



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