

University of Innsbruck / Timber Engineering Unit holzbaulehrstuhl
Universität Innsbruck

Quality Control in Wood Construction

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Workshop 2 – 2011 Wood Structures Symposium

What is quality?

Quality is defined as:
 “Degree to which a set of inherent characteristics fulfills requirements”
 -ISO 9001:2008-

Quality management
 ... the whole of features and characteristics of a product regarding its ability to meet the quality requirements.
 EN ISO 9000

Rules for the organization, implementation and monitoring of measures

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Regulations and quality marks



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Why quality control?



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Why quality control?



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Quality requirements

What customers want:

- Customer focus and customer service
- Compliance with the contractual agreed quality

What companies want:

- Profitable construction project
- Compliance with the contractual agreed quality

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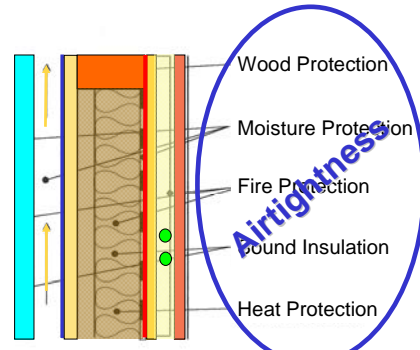
Quality management - works!



stave church - 900 years

farm - 500 years

Quality requirements - present



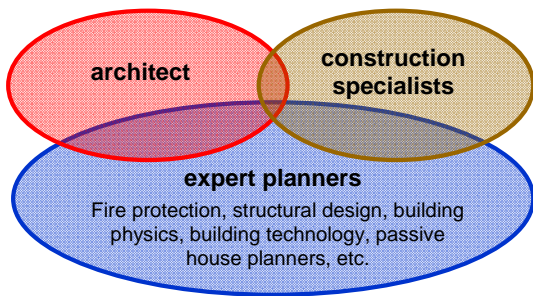
Materials for timber constructions



Support by certified constructions

Material	Thickness	Weight	Volume	Area
A	50.0	1,300	300	2,000
B	10.0	100	100	1,000
C	50.0	1,300	300	2,000
D	50.0	1,300	300	2,000
E	50.0	1,300	300	2,000
F	10.0	100	100	1,000
G	10.0	100	100	1,000
H	10.0	100	100	1,000
I	10.0	100	100	1,000

Quality criteria for the construction process



Requirements for high quality products

- **Quality Awareness**
 - The company management must want quality
- **Quality Production**
 - Specialization, prefabrication
- **Quality Products**
 - Clear definition, e.g. wall elements with quality certification labels
- **Quality Control**
 - Internal and external controlling (external monitoring)
- **Quality Management**
 - Procedures: Organization and implementation of measures

Quality Control

Quality Monitoring during Production and Construction

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Quality Monitoring during production and construction

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Quality Monitoring during Production and Construction

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Damage caused by leakages

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Damage caused by leakages

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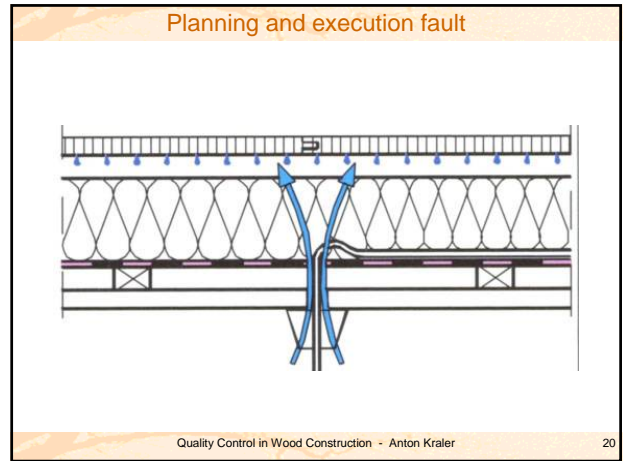
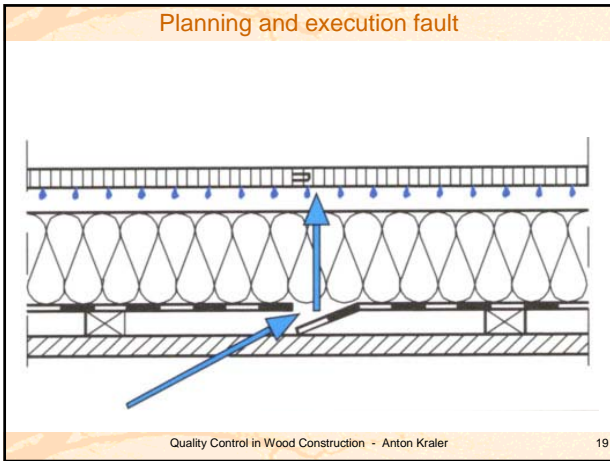
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Damage caused by leakages

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Why quality control? Why airtightness?

Problem: A gap with airflow from humid side

outside: 0°C, 80% r. F.

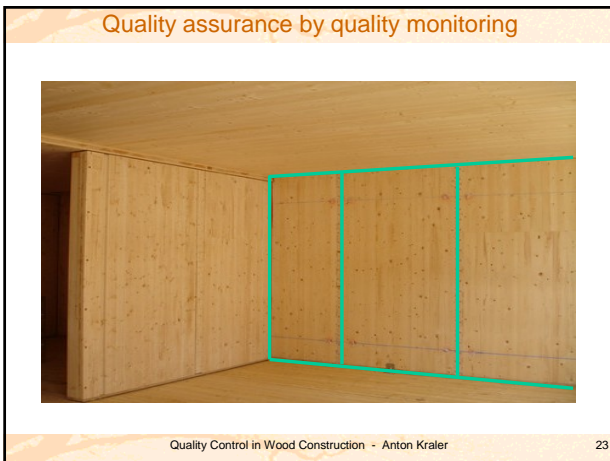
inside: 20°C, 50% r. F.

360g water/day/m

1 mm gap in construction

For comparison: with vapor diffusion, only 1g water/day/m²

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Quality control – airtightness

Measuring System

- Door frame with a membrane
- Measuring Instrument (data capture and evaluation)
- Fan

Aids and Appliances

Fog generator Flow meter

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Quality control – timber

Moisture measuring device

Ultrasonic testing equipment

Drill resistance measuring device

Fractometer tests

Bending test

Hardwood core drill

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Quality control – thermal insulation

without thermal insulation

with thermal insulation

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Why quality control? Why airtightness?

Heat loss through leakage

4.8 times more heat is lost across the gap than over the entire surface of 1m² of insulation.

14 cm

1 m

1 mm

Example:
 U-Value (calculated) = 0.30 W/m²K
 U-Value with the gap (0.30 W/m²K x 4.8) = **1,44 W/m²K**

outside: 0°C, 80% r. F.; inside: 20°C, 50% r. F.;

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Thermal building envelope

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Infrared thermography

Thermography camera

VARIOSCAN

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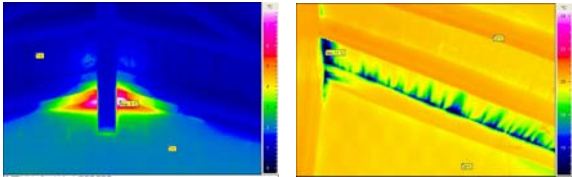


Quality control: blower door - thermography

Example: Installation (wiring)

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Quality control: blower door - thermography

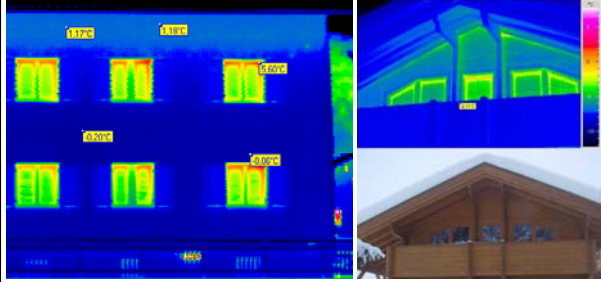

Example: roof connection

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Quality control: blower door - thermography

Example: faultless execution

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Quality control: heating, water, ventilation





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Thank you for your attention

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