

11.03_PH-SUMMER SCHOOL

EXAMPLES OF SPECIAL FEATURES PH and Straw-heat insulation

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Language support: William GALLAGHER
Date: 2009-06-13

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Straw heat insulation

Straw bales can be used as a structural element, as heat insulation, or both.

Straw is a very sustainable material for heat insulation.

For the construction, only

- rectangular bales,
- highly compressed and
- bound with strings,

can be used.



Source: Foto: www.levihn.de/dienstleistungen3.php?l=10&i=1 (2008-12-09, 22:50)

Straw heat insulation

Straw-bale buildings

Bales of straw can be used in the way of:

- Non-load carrying structures

The heat insulation material consisting of bales of straw, is added to the load carrying lightweight construction

- Load carrying structures / structural elements

The bales of straw are the load carrying structure (problem of compression and subsidence!)

Source:

Straw heat insulation

Straw-bale sizes

In Central Europe, three types are available:

- Small bales: h 46 (50) x b 36 x l 40-110 cm
- Medium bales: h 50 x b 80 x l 70-240 cm
- Large bales: h 70 x b 120 x l 100-300 cm
(the length of the large bales is adjustable in 5 cm steps)



Source: Fotos left: www.idee-media.com/fun/verkauf/lieferung7/strohballen.jpg, right: www.stroh-meindl.de/htm/stroh.htm (2008-12-09, 22:50)

Straw heat insulation

Straw-bale characteristics



Size of tested small bales:

- Length: 60 – 90 cm
- Broad: 46 – 50 cm
- High: 36 – 40 cm

Necessary quality of bales

- Density: 80 – 120 kg/m³
- Moisture: < 15 %
- Percentage of weed: < 0,5 % w/w
- Percentage of residual corn: < 0,4 % w/w

Source: Fotos: www.allmermacke.at/ews/frameset.html (2008-12-09, 22:10)

Straw heat insulation

Straw-bale characteristics



Technical characteristics:

- Heat conductivity (λ): 0.046 W/mK
- Reaction to fire tests (EN ISO 9239-1): B2
- Resistance to fluid flow: 0.43 kPa s/sqm
- Max. water absorption: 5 kg/sqm
- Subsidence of the elements: < 2.3 %
- Resistance to biological influences: Class 3

These values are the results of an Austrian research project within the Program for Technologies for Sustainable Development “Factory of Tomorrow”.

Source:

Straw heat insulation Straw-bale use (non-load carrying)



Source: www.fasba.de/images/stories/projekte/erz-gugel/Bilder_Strohdaemmung.pdf (2008-12-11, 23:45) Fachverband Strohballebau Deutschland e.V.

Straw heat insulation

Straw-bale use (non-load carrying)

Straw heat insulation filled into prefabricated light-weight framework elements.



Source: www.fasba.de/images/stories/projekte/erz-gugel/Bilder_Strohdaemmung.pdf (2008-12-11, 23:45) Fachverband Strohballebau Deutschland e.V.

11.03.02

“S-House” Seminar centre, Boeheimkirchen
(AT), 2005

Architecture:

Scheicher Architekten
A 5421 Adnet 241, Austria

www.scheicher.at

and

GrAT-Center for Appropriate Technology

TU – Vienna, Wiedner Hauptstr. 8 - 10

A 1040 Vienna, Austria

www.grat.at

“S-House” Seminar centre Böheimkirchen (AT) Architectural concept

Architecture: Scheicher Architects



- A 2-storey seminar centre with office was built on an area of 200 m².
- The “S-House” combines modern architecture with innovative, sustainable construction.
- It is a research project for a very highly sustainable way of construction using very little grey energy (energy input to produce the construction materials).
- A lightweight timber construction with bales of straw is used as the building shell.

Austrian State Prize for Architecture and Sustainability 2006

11.03.02.03

SPECIAL FEATURES, PH and Straw-heat insulation

“S-House” Seminar centre Böheimkirchen (AT)

Architecture: Scheicher Architects

Architectural concept



A large flat roof protects the wooden façade and the heat insulation

Source: Foto: GrAT -Center for Appropriate Technology

11.03.02.04

SPECIAL FEATURES, PH and Straw-heat insulation

“S-House” Seminar centre Böheimkirchen (AT) Architectural concept

Architecture: Scheicher Architects



Some of the northward windows can be closed with window shutters

Source: Foto: GrAT -Center for Appropriate Technology

“S-House” Seminar centre Böheimkirchen (AT)
Architectural concept

Architecture: Scheicher Architects



In summer the sun protection is given by an overhang of the roof and the trees of the garden.

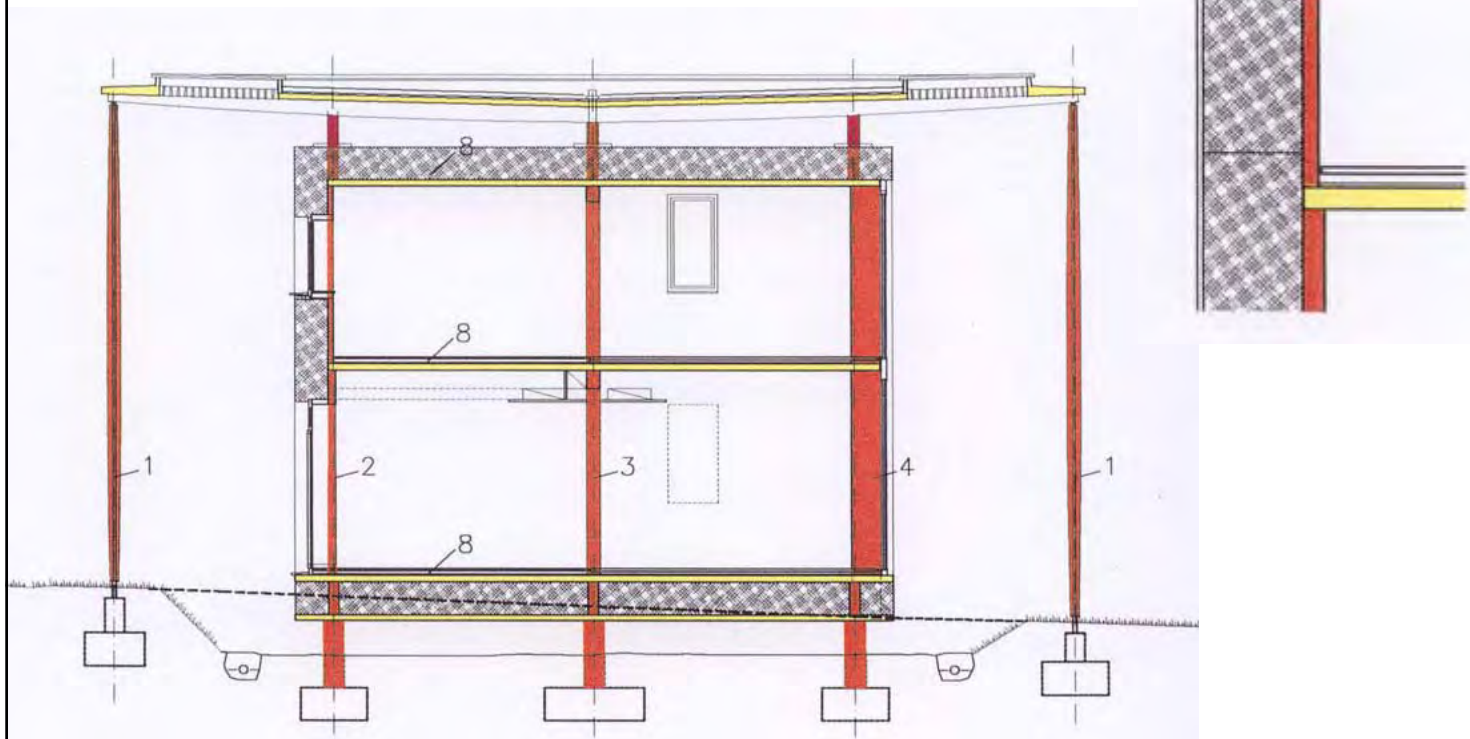
Source: Foto: www.scheicher.at/subpage.php?tid=2&sid=66 (2008-02-18, 23:20)

“S-House” Seminar centre Böheimkirchen (AT)

Architecture: Scheicher Architects

Architectural concept

Section



Source: R. Wimmer, H. Hohensinner, M. Drack, Endbericht EU LIFE Umweltprojekt S-HOUSE, Nr. LIFE00ENV/A/000243,

11.03.02.07

SPECIAL FEATURES, PH and Straw-heat insulation

“S-House” Seminar centre Böheimkirchen (AT) Building concept

Architecture: Scheicher Architects



Point foundation

Source: Fotos: GrAT -Center for Appropriate Technology

“S-House” Seminar centre Böheimkirchen (AT)

Building concept

Structure raised on the point foundation

Cross-laminated panels and laminated wooden columns



Source: Fotos: www.baubiologie.at/europe/austria/shouse_boeheimkirchen.html (2007-12-28, 08:30)

11.03.02.09

SPECIAL FEATURES, PH and Straw-heat insulation

“S-House” Seminar centre Böheimkirchen (AT) Building concept

Architecture: Scheicher Architects



Construction of the wall units.



06.10.2004

Fixing the ceiling with
the aid of an crane.

Source: Projektfabrik Waldhör KEG

“S-House” Seminar centre Böheimkirchen (AT) Building concept

Pre-fabricated
cross-
laminated
wooden
panels
for a rapid
and precise
construction



Source: Fotos: R. Wimmer, H. Hohensinner, M. Drack, Endbericht EU LIFE Umweltprojekt S-HOUSE, Nr. LIFE00ENV/A/000243,

11.03.02.11

SPECIAL FEATURES, PH and Straw-heat insulation

“S-House” Seminar centre Böheimkirchen (AT) Building concept

Architecture: Scheicher Architects



Insulation of the
top ceiling by
bales of straw.

Awning for covering the bales of straw
still lying outdoor.



13.10.2004

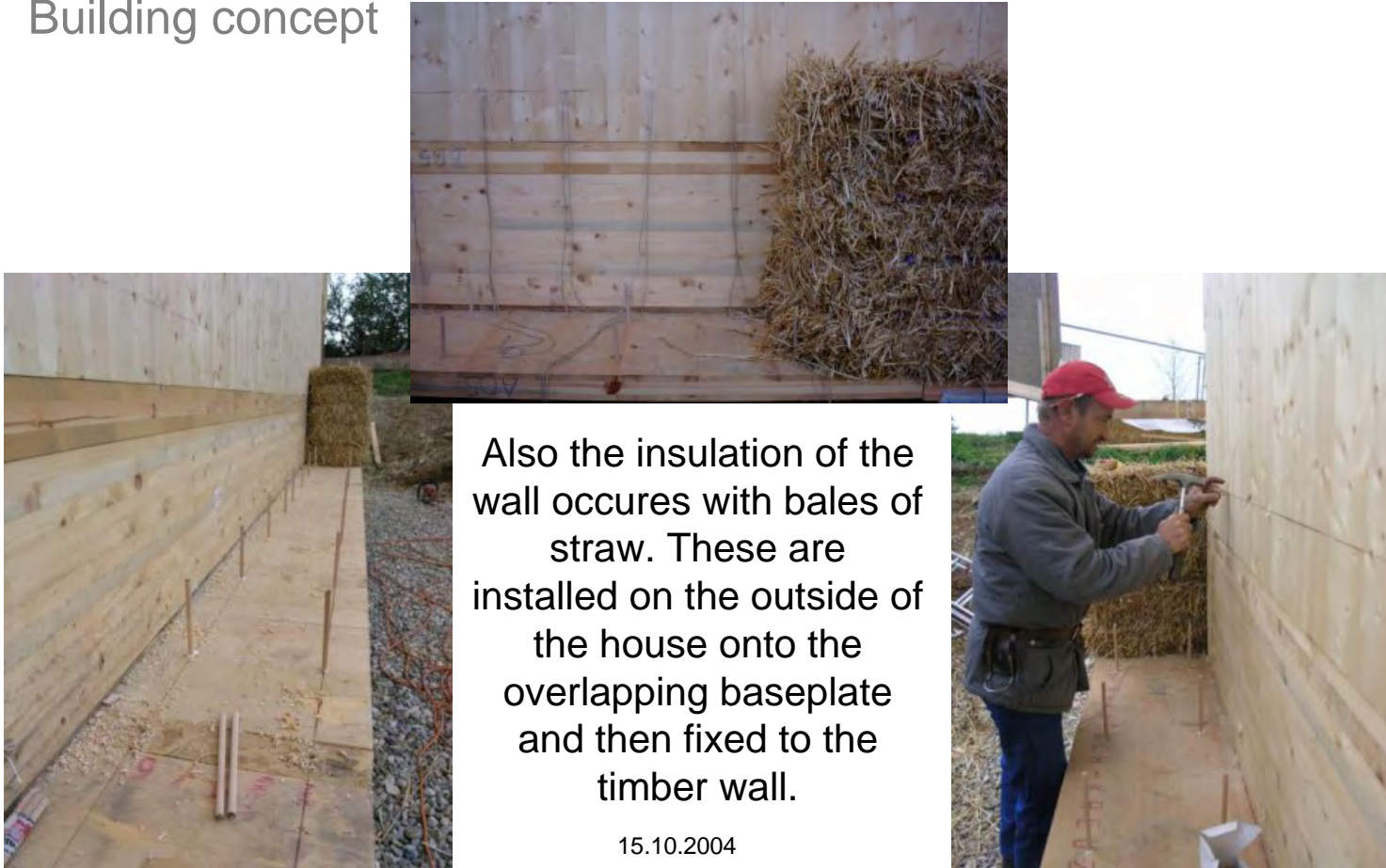
Source: Projektfabrik Waldhör KEG

11.03.02.12

SPECIAL FEATURES, PH and Straw-heat insulation

“S-House” Seminar centre Böheimkirchen (AT) Building concept

Architecture: Scheicher Architects



Also the insulation of the wall occurs with bales of straw. These are installed on the outside of the house onto the overlapping baseplate and then fixed to the timber wall.

15.10.2004

Source: Projektfabrik Waldhör KEG

11.03.02.13

SPECIAL FEATURES, PH and Straw-heat insulation

“S-House” Seminar centre Böheimkirchen (AT) Building concept

Architecture: Scheicher Architects



In teamwork the 90 kg bales of straw are lifted onto the wooden skewers. They should be arranged as close to the wall as possible.

Source: Projektfabrik Waldhör KEG

11.03.02.14

SPECIAL FEATURES, PH and Straw-heat insulation

“S-House” Seminar centre Böheimkirchen (AT) Building concept

Architecture: Scheicher Architects

Heat insulation
with non-load
carrying
bales of straw...

... fixed with
wooden plugs
and strings



Source: Fotos: www.baubiologie.at/europe/austria/shouse_boeheimkirchen.html (2007-12-28, 08:30)

“S-House” Seminar centre Böheimkirchen (AT) Building concept



Checking
moisture in
the straw –
everything is OK



16.11.2004



Source: Projektfabrik Waldhör KEG

“S-House” Seminar centre Böheimkirchen (AT) Building concept

The plaster
(and the wind-
tight layer) is
made from
natural clay



Source: R. Wimmer, H. Hohensinner, M. Drack, Endbericht EU LIFE Umweltprojekt S-HOUSE, Nr. LIFE00ENV/A/000243,

“S-House” Seminar centre Böheimkirchen (AT) Building concept



Source: Projektfabrik Waldhör KEG

Foto right: Hannes Hohensinner GrAT

“S-House” Seminar centre Böheimkirchen (AT) Building concept



“Treeplast”
screws for
anchoring
the façade
substructure
directly in the
straw bales.



Mounting
the boarding
with wooden
plugs



Source: Fotos: www.baubiologie.at/europe/austria/shouse_boeheimkirchen.html (2007-12-28, 08:30)

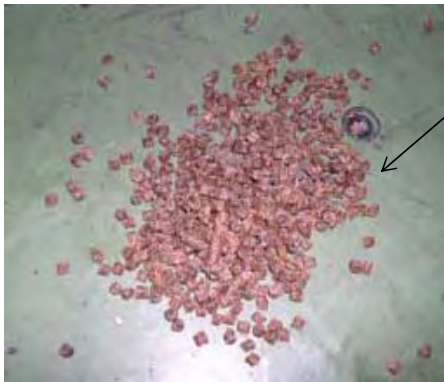
11.03.02.19

SPECIAL FEATURES, PH and Straw-heat insulation

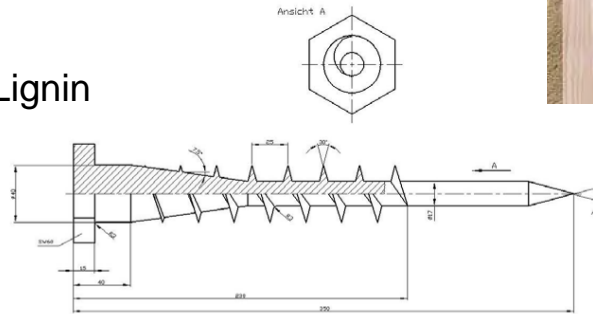
“S-House” Seminar centre Böheimkirchen (AT) Building concept

Architecture: Scheicher Architects

“Treeplast” screws are made of a biopolymer.



Lignin



The screws are bio-degradable.

Source: Fotos: R. Wimmer, H. Hohensinner, M. Drack, Endbericht EU LIFE Umweltprojekt S-HOUSE, Nr. LIFE00ENV/A/000243,

“S-House” Seminar centre Böheimkirchen (AT) Building concept



Source: GrAT, Juli 2005

“S-House” Seminar centre Böheimkirchen (AT) Building concept



A 3-pane glazing ($U_w = 0.50 \text{ W/m}^2\text{K}$) for the windows and for the south façade



11.03.02.22

SPECIAL FEATURES, PH and Straw-heat insulation

“S-House” Seminar centre Böheimkirchen (AT) Building concept

Architecture: Scheicher Architects



10.03.2005

Source: Foto left: Projektfabrik Waldhör KEG

Foto right: Tobias Tengler GrAT

11.03.02.23

SPECIAL FEATURES, PH and Straw-heat insulation

“S-House” Seminar centre Böheimkirchen (AT) Building concept Interior

Architecture: Scheicher Architects



The ground floor is made of natural stone (to store the solar energy), the upper floor of wooden ship flooring.

Source: Fotos: www.scheicher.at/subpage.php?tid=2&sid=66 (2008-02-18, 23:20)

“S-House” Seminar centre Böheimkirchen (AT) Energy concept

Architecture: Scheicher Architects

The subsoil
heat
exchanger
is made with
two 35 m
PE pipes.

The
ventilation
ducts
in the
house are
made of
wooden
panels.

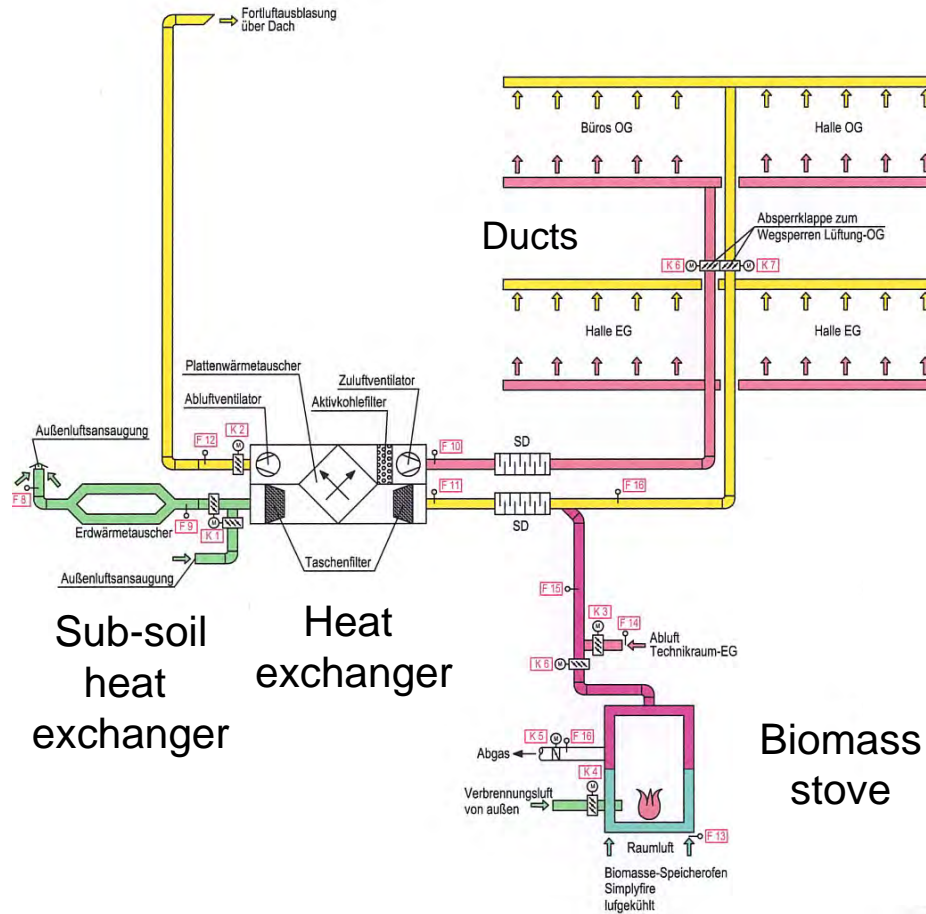


Source: Fotos: R. Wimmer, H. Hohensinner, M. Drack, Endbericht EU LIFE Umweltprojekt S-HOUSE, Nr. LIFE00ENV/A/000243

“S-House” Seminar centre Böheimkirchen (AT)

Energy concept
 Ventilation and heating

The heat exchanger
 in the service room



Source: Foto and schema: R. Wimmer, H. Hohensinner, M. Drack, Endbericht EU LIFE Umweltprojekt S-HOUSE, Nr. LIFE00ENV/A/000243

11.03.02.26

SPECIAL FEATURES, PH and Straw-heat insulation

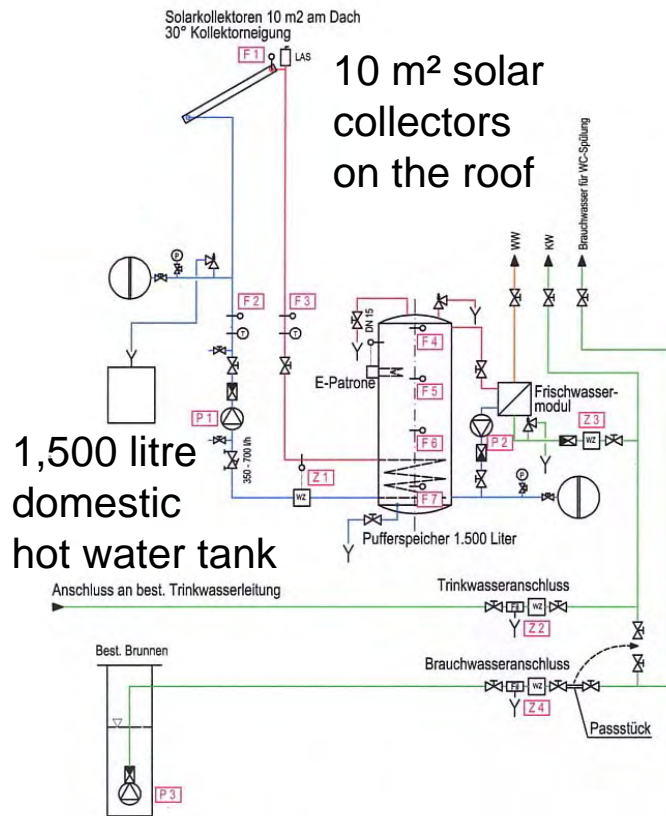
“S-House” Seminar centre Böheimkirchen (AT)

Architecture: Scheicher Architects

Energy concept

Heating by solar panels and stove

This special furnace heats the room via radiation. The ventilated double shell heats the ventilation system. The outside stoneware shell serves as a heat storage mass. The supply air comes from the outside.



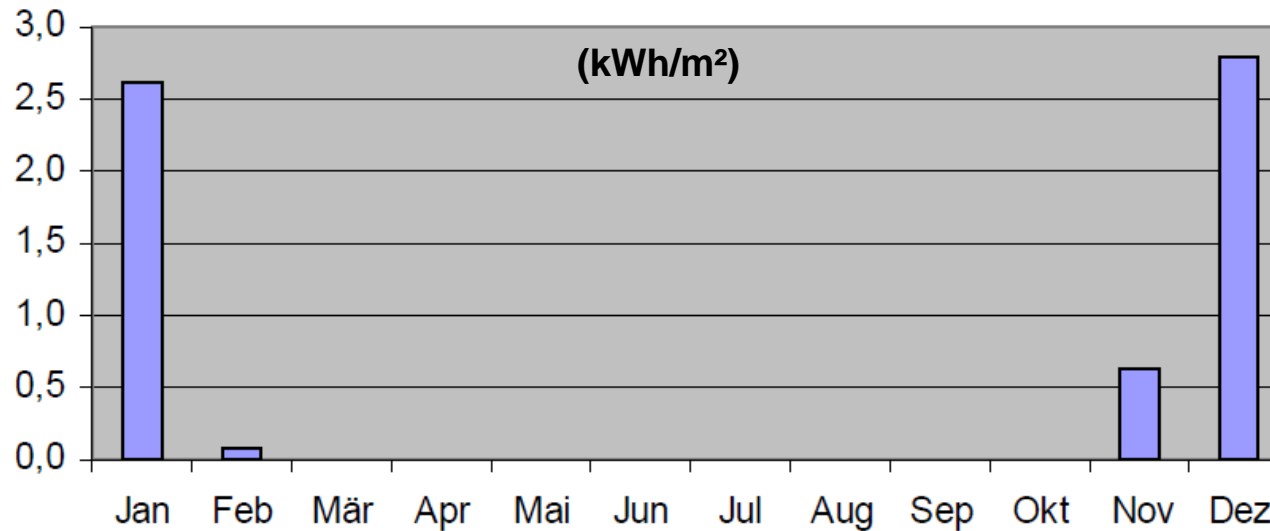
Source: Foto and schema: R. Wimmer, H. Hohensinner, M. Drack, Endbericht EU LIFE Umweltprojekt S-HOUSE, Nr. LIFE00ENV/A/000243

“S-House” Seminar centre Böheimkirchen (AT)

Architecture: Scheicher Architects

Result

Specific monthly heat requirement for the heating



When planning the “S-House”, its life cycle costs are already considered. The production of the materials, construction, maintenance, use and destruction as well as their negative influences on the environment are minimized.

11.03.03

Holiday apartments Lana (IT), 2006

Architecture: Werner Schmidt
Areal Fabrica 117,
CH-7166 Trun, Switzerland
www.atelierwernerschmidt.ch
and
Margareta Schwarz,
I - Meran, Italy

Holiday apartments Lana (IT)

Architecture: Werner Schmidt

Architectural concept

These holiday apartments have been built in a vineyard. A pergola of grapevines will cover them in a few years. The flat buildings have a large southward glazing with a sun protection framework. The rooms are parabola-shaped.



South Tyrolean Prize for Architecture 2007

Source: Foto: www.bz.archiworld.it/tb/4premio/b04.html (2008-12-28, 12:45)

Holiday apartments Lana (IT) Building concept



Facing the garden, there is a terrace in front of the glazing.
On the entrance side, the parabola-shaped straw walls are plastered and have only two openings.

Source: Fotos: www.atelierwernerschmidt.ch/Esser.html (2008-12-28, 12:15)

Holiday apartments Lana (IT) Construction



Prefabricated floor elements are mounted on a strip foundation. Inside the elements, there is also straw heat insulation.

The straw bales have to be moved and placed with a crane.



Source: Fotos: www.atelierwernerschmidt.ch/Essebauablauf.html (2008-12-28, 12:15)

Holiday apartments Lana (IT) Construction

Architecture: Werner Schmidt



The prefabricated floor slab elements and some of the window frames are being mounted.

Source: Foto: www.bz.archiworld.it/tb/4premio/b04.html (2008-12-28, 12:45)

Holiday apartments Lana (IT) Construction



The straw bales are used as structural elements. Medium-sized bales are being used.

Source: Foto: www.bz.archiworld.it/tb/4premio/b04.html (2008-12-28, 12:45)

Holiday apartments Lana (IT) Construction



To anticipate later subsidence, the bales of straw are compressed round about by belts.



Source: Fotos: www.atelierwernerschmidt.ch/Essebauablauf.html (2008-12-28, 12:15)

11.03.03.08

SPECIAL FEATURES, PH and Straw-heat insulation

Holiday apartments Lana (IT)

Architecture: Werner Schmidt

Construction

Clamping
belts fix the
bales of straw.
A screen
serves as the
base for the
plaster.



Source: Foto: www.bz.archiworld.it/tb/4premio/b04.html (2008-12-28, 12:45)

Holiday apartments Lana (IT) Construction

Natural loam plaster is being sprayed on the plaster base elements and on the bales of straw and then smoothed.



Planning time: 10 months
Construction time: 4 months
Living area: 126m²

Source: Fotos: www.atelierwernerschmidt.ch/Essebbaublauf.html (2008-12-28, 12:15)

Holiday apartments Lana (IT)



Source: Foto left: www.bz.archiworld.it/tb/4premio/b04.html (2008-12-28, 12:45)

Foto right: www.atelierwernerschmidt.ch/Esser.html (2008-12-28, 12:15)

Holiday apartments Lana (IT)



Source: Fotos: www.bz.archiworld.it/tb/4premio/b04.html (2008-12-28, 12:45)

Holiday apartments Lana (IT)



Source: Fotos: www.bz.archiworld.it/tb/4premio/b04.html (2008-12-28, 12:45)

Holiday apartments Lana (IT)



Source: Fotos: www.atelierwernerschmidt.ch/Esser.html (2008-12-28, 12:15)

11.03.04

Holiday apartments and atelier Graun (IT),
2007

Architecture: Werner Schmidt
Areal Fabrica 117,
CH 7166 Trun, Schwitzerland
www.atelierwernerschmidt.ch

Holiday apartments and atelier Graun (IT) Architectural concept

Architecture: Werner Schmidt

- Compact volume
- Tent roof with a skylight
- Thermal optimized building shell



- 4 holiday apartments and one atelier (total ~400 m²)
- Very sustainable materials

Holiday apartments and atelier Graun (IT) Architectural and building concept



The building is to be integrated into the landscape and the alpine village.

Bales of straw are used as load carrying elements.

Holiday apartments and atelier Graun (IT) Building concept



The wooden tent roof construction is mounted on the walls made of bales of straw.

Source: Fotos: www.atelierwernerschmidt.ch/Fliri.html (2008-12-28, 12:15)



11.03.04.05

SPECIAL FEATURES, PH and Straw-heat insulation

Holiday apartments and atelier Graun (IT) Building concept

Architecture: Werner Schmidt

A wooden cover ring on top of the straw walls is the basis for the prefabricated roof construction.



Sealing strips cover the gaps between the panels for an air-tight roof construction.

Source: Fotos: www.fliri.net/strohhaus (2008-12-28, 12:15)

Holiday apartments and atelier Graun (IT) Building concept



The heat insulation made of
straw bales is mounted on
the outside.



Source: Fotos: www.atelierwernerschmidt.ch/FIiri.html (2008-12-28, 12:15)

11.03.04.07

SPECIAL FEATURES, PH and Straw-heat insulation

Holiday apartments and atelier Graun (IT) Building concept

Architecture: Werner Schmidt



The tent roof is covered with
wooden shingles.



Source: Fotos: www.atelierwernerschmidt.ch/Fliri.html (2008-12-28, 12:15)

11.03.05

Single family house Disentis (CH), 2002

Architecture: Werner Schmidt
Areal Fabrica 117,
CH 7166 Trun, Schwitzerland
www.atelierwernerschmidt.ch

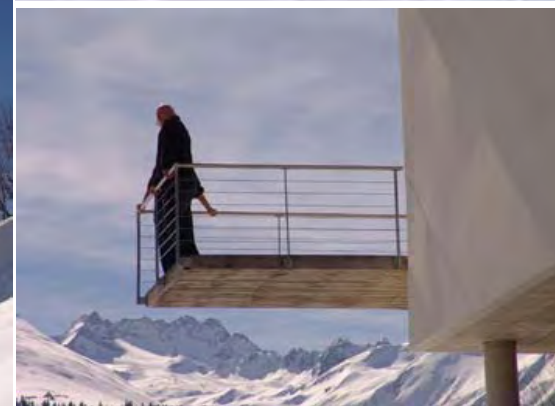
11.03.05.02

SPECIAL FEATURES, PH and Straw-heat insulation

Architecture: Werner Schmidt

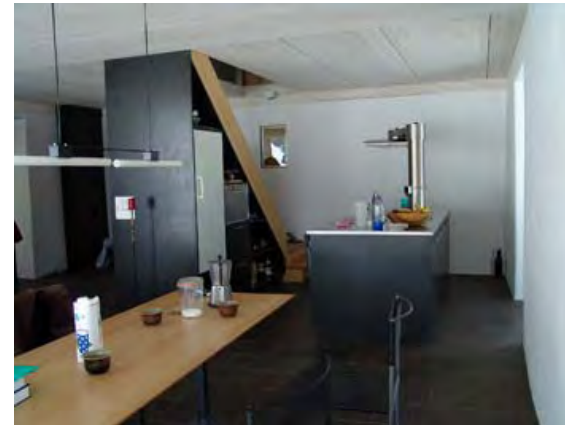
Cottage Disentis (CH) Architectural concept

- Compact volume
- Optimized thermal shell with straw bales
- South face glazing
- High quality glass in a post-and beam construction
- Summer sun protection with sun blinds
- Use of very sustainable building materials



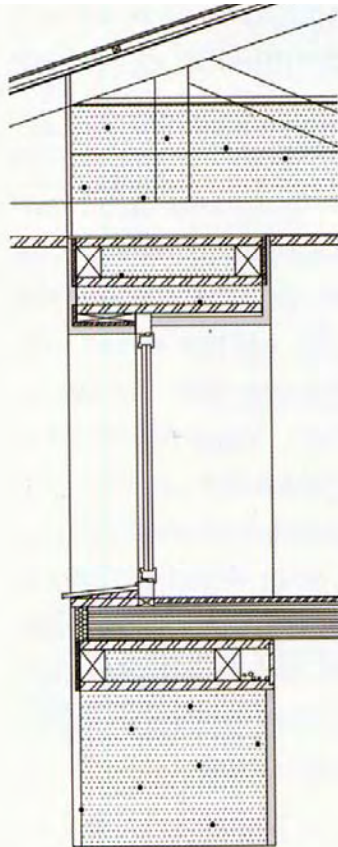
Source: Fotos: www.atelierwernerschmidt.ch/Braun.html (2008-12-28, 13:30)

Cottage Disentis (CH) Architectural concept



Source: Fotos: www.atelierwernerschmidt.ch/Braun.html (2008-12-28, 13:30)

Cottage Disentis (CH) Building concept



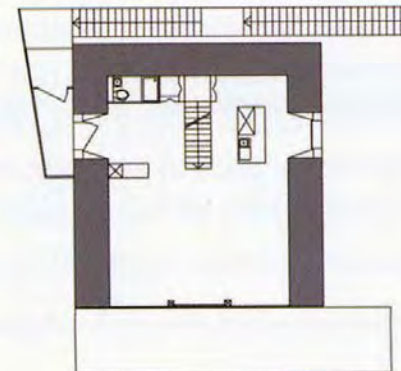
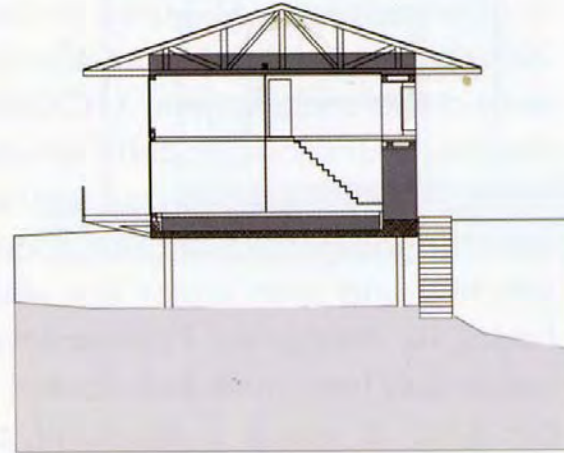
| U-values | W/(m ² K) |
|----------|----------------------|
| Walls | 0.04 |
| Roof | 0.07 |
| Floor | 0.10 |
| Window | 0.70 |

Living area: 130m²

Wall construction

| | |
|----------------------------------|----------------|
| Fine lime plaster / plastic grid | 5 mm |
| Rough lime plaster / metal grid | 40 mm |
| Straw bales | 1200 mm |
| Rough lime plaster / metal grid | 40 mm |
| Fine lime plaster / plastic grid | 5 mm |
| Sum | 1290 mm |

U-value: 0.04 W/(m²K)



Cottage Disentis (CH) Building concept



Bales of straw serve as the load carrying structural elements. The clamping belts to pre-compress the straw bales are fixed on the concrete beams of the platform.

Source: Fotos: www.atelierwernerschmidt.ch/brbauablauf.html (2008-12-28, 13:50)

Cottage Disentis (CH) Building concept



Source: Fotos: www.atelierwernerschmidt.ch/brbauablauf.html (2008-12-28, 13:50)

11.03.05.07

SPECIAL FEATURES, PH and Straw-heat insulation

Architecture: Werner Schmidt

Cottage Disentis (CH) Building concept



Source: Fotos: www.atelierwernerschmidt.ch/brbauablauf.html (2008-12-28, 13:50)

11.03.06

Single family house Wahlen / Laufen (CH), 2004 - 2005

Architecture: Werner Schmidt
Areal Fabrica 117,
CH 7166 Trun, Schwitzerland
www.atelierwernerschmidt.ch

11.03.06.02

SPECIAL FEATURES, PH and Straw-heat insulation

Single family house Wahlen / Laufen (CH) Architectural concept

Architecture: **Werner Schmidt**



- Compact volume
- Optimized thermal shell with straw bales
- South face glazing
- High quality glass in a post-and beam construction
- Summer sun protection with sun blinds
- Cold storage rooms form free outside spaces
- Use of very sustainable building materials

Source: Foto: www.atelierwernerschmidt.ch/Schmidlin.html (2008-05-11, 01:20)

11.03.06.03

SPECIAL FEATURES, PH and Straw-heat insulation

Single family house Wahlen / Laufen (CH) Building concept

Architecture: Werner Schmidt



Excavation work and building the strip foundations.

Source: Fotos: Rainer Hettenbach/Thomas Schmidlin, www.iglehm.ch/asp/newsdet.asp?ID=50 (2008-05-11, 01:20)

11.03.06.04

SPECIAL FEATURES, PH and Straw-heat insulation

Single family house Wahlen / Laufen (CH) Building concept

Architecture: Werner Schmidt



Mounting the insulated
floor elements on a strip foundation.



Source: Fotos: Rainer Hettenbach/Thomas Schmidlin, www.iglehm.ch/asp/newsdet.asp?ID=50 (2008-05-11, 01:20)

Single family house Wahlen / Laufen (CH) Building concept

Substructure of the ground ring



Mounting the door frame

Source: Fotos: Rainer Hettenbach/Thomas Schmidlin, www.iglehm.ch/asp/newsdet.asp?ID=50 (2008-05-11, 01:20)

11.03.06.06

SPECIAL FEATURES, PH and Straw-heat insulation

Single family house Wahlen / Laufen (CH) Building concept

Architecture: Werner Schmidt

Fixing the ground ring with the possibility to thread through the clamping belts.



Shifting the large bales of straw to the ground ring.

Source: Fotos: Rainer Hettenbach/Thomas Schmidlin, www.iglehm.ch/asp/newsdet.asp?ID=50 (2008-05-11, 01:20)

Single family house Wahlen / Laufen (CH) Building concept

Building the ground floor wall...



... and stuffing hollow spaces.

Source: Fotos: Rainer Hettenbach/Thomas Schmidlin, www.igleh.ch/asp/newsdet.asp?ID=50 (2008-05-11, 01:20)

11.03.06.08

SPECIAL FEATURES, PH and Straw-heat insulation

Single family house Wahlen / Laufen (CH) Building concept

Architecture: Werner Schmidt



In the corners, the bales of straw are clasped with metal clamps.



Source: Fotos: Rainer Hettenbach/Thomas Schmidlin, www.iglehm.ch/asp/newsdet.asp?ID=50 (2008-05-11, 01:20)

11.03.06.09

SPECIAL FEATURES, PH and Straw-heat insulation

Single family house Wahlen / Laufen (CH) Building concept

Architecture: Werner Schmidt

Mounting the laminated
wooden cover belt elements



Source: Fotos: Rainer Hettenbach/Thomas Schmidlin, www.iglehm.ch/asp/newsdet.asp?ID=50 (2008-05-11, 01:20)

11.03.06.10

Single family house Wahlen / Laufen (CH) Building concept

SPECIAL FEATURES, PH and Straw-heat insulation
Architecture: Werner Schmidt



Bolting the laminated wooden cover belt



Clamping belts over the cover ring

Source: Fotos: Rainer Hettenbach/Thomas Schmidlin, www.iglehm.ch/asp/newsdet.asp?ID=50 (2008-05-11, 01:20)

11.03.06.11

Single family house Wahlen / Laufen (CH) Building concept

SPECIAL FEATURES, PH and Straw-heat insulation
Architecture: Werner Schmidt



Mounting the ceiling beams...

Source: Fotos: Rainer Hettenbach/Thomas Schmidlin, www.iglehm.ch/asp/newsdet.asp?ID=50 (2008-05-11, 01:20)

Single family house Wahlen / Laufen (CH) Building concept



... and fastening the panels

Single family house Wahlen / Laufen (CH) Building concept



Outside wall construction of the upper floor

Source: Fotos: Rainer Hettenbach/Thomas Schmidlin, www.iglehm.ch/asp/newsdet.asp?ID=50 (2008-05-11, 01:20)

11.03.06.14

SPECIAL FEATURES, PH and Straw-heat insulation

Single family house Wahlen / Laufen (CH) Building concept

Architecture: Werner Schmidt



Pre-compression of the
straw bales
with clamping belts
(upper floor)

Source: Fotos top: Rainer Hettenbach/Thomas Schmidlin, www.iglehm.ch/asp/newsdet.asp?ID=50

Foto down: www.atelierwernerschmidt.ch/Schmidlinbauablauf.html (2008-05-11, 01:20)

11.03.06.15

Single family house Wahlen / Laufen (CH) Building concept

Mounting the roof elements

Filling up the roof elements with straw



Source: Fotos left and top: Rainer Hettenbach/Thomas Schmidlin, www.iglehm.ch/asp/newsdet.asp?ID=50 right: www.atelierwernerschmidt.ch/Schmidlinbauablauf.html (2008-05-11, 01:20)

Single family house Wahlen / Laufen (CH) Building concept



Preparation for outside plaster



Source: Foto left: R. Hettenbach/T. Schmidlin, www.iglehm.ch/asp/newsdet.asp?ID=50 (2008-05-11, 01:20) Fotos right: www.atelierwernerschmidt.ch/Schmidlinbauablauf.html (2008-05-11, 01:20)

Single family house Wahlen / Laufen (CH) Construction



Mounting of the electrical installation

Source: Fotos: Rainer Hettenbach/Thomas Schmidlin, www.iglehm.ch/asp/newsdet.asp?ID=50 (2008-05-11, 01:20)

11.03.06.18

SPECIAL FEATURES, PH and Straw-heat insulation

Single family house Wahlen / Laufen (CH) construction

Architecture: Werner Schmidt



Mice protection grid

A geo-net as the basis for the plaster

Source: Fotos: Rainer Hettenbach/Thomas Schmidlin, www.iglehm.ch/asp/newsdet.asp?ID=50 (2008-05-11, 01:20)

11.03.06.19

SPECIAL FEATURES, PH and Straw-heat insulation

Single family house Wahlen / Laufen (CH) construction

Architecture: Werner Schmid



Spray on the loam plaster inside

Source: Fotos: Rainer Hettenbach/Thomas Schmidlin, www.iglehm.ch/asp/newsdet.asp?ID=50 (2008-05-11, 01:20)

Single family house Wahlen / Laufen (CH) construction



Spray on the loam plaster outside

Source: Fotos: Rainer Hettenbach/Thomas Schmidlin, www.iglehm.ch/asp/newsdet.asp?ID=50 (2008-05-11, 01:20)

Single family house Wahlen / Laufen (CH) construction

The final loam layer is being applied.



The loam plaster gets the finishing touches.

Source: Fotos: Rainer Hettenbach/Thomas Schmidlin, www.iglehm.ch/asp/newsdet.asp?ID=50 (2008-05-11, 01:20)

Single family house Wahlen / Laufen (CH) construction



The finished inside and outside plaster

Source: Fotos: Rainer Hettenbach/Thomas Schmidlin, www.iglehm.ch/asp/newsdet.asp?ID=50 (2008-05-11, 01:20)

Single family house Wahlen / Laufen (CH) construction



Preparations for the terrace and an annex.

Source: Fotos: Rainer Hettenbach/Thomas Schmidlin, www.iglehm.ch/asp/newsdet.asp?ID=50 (2008-05-11, 01:20)

11.03.06.24

SPECIAL FEATURES, PH and Straw-heat insulation

Single family house Wahlen / Laufen (CH) construction

Architecture: Werner Schmidt



The northward side; an annex for cold storage and the entrance

Source: Fotos: Rainer Hettenbach/Thomas Schmidlin, www.iglehm.ch/asp/newsdet.asp?ID=50 (2008-05-11, 01:20)

Single family house Wahlen / Laufen (CH)

The
finished
house
inside
and
outside.



Source: Fotos: www.atelierwernerschmidt.ch/Schmidlin.html (2008-05-11, 01:20)