

Clay passive-house office building, Tattendorf (NÖ)

Source: natur-lehm-lehm-baumodule-präsentation.pdf
 Resource-orientated Constructions | Univ. Prof. Arch. DI Dr. Martin Treberspurg

Clay passive-house office building, Tattendorf (NÖ)

- wasser-luft-wärmetauscher
- erde-wasser-wärmetauscher als rohregister
- wärme- und feuchterückgewinnung (2 geräte)
- zuluft über lehmrohrenzgielekanäle und durch zwischenwände
- bio-äthanol-brenner (luft-nachheizung und befeuchtung)
- einflügelform fledermäuse
- nutzwasserbrunnen
- installationsschacht
- aussenluftansaugung

→ verbrauchte luft
 → warm luft
 → frisch luft / kalt
 → kälte - vortlauf
 → kälte - rücklauf

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Clay passive-house office building, Tattendorf (NÖ)

ÖKOLOGISCHE BAUSTOFFE:

- **HolzleichtMaterial**
 - Vorfertigung
- **Massive HolzCorners**
 - Holzdübel (Londyb)
- **Strohballendämmung**
- **Lehmfaserputz**
- **Lehmziegel**
- **Lehmbauplatten**
 - Anstrich with Kaseinfarbe
- **Lehmfaserestrich**
- **Leichtlehm-Erds substrat für Gründach**
- **Holzboden**
- **Holzinnen-schalung**

Außenwall

Aufbau:
 1,5 cm Lehm (Biofaserlehmputz)
 3 cm Rauhschalung
 40 cm Stroh
 3,5 cm Lattung
 8 cm Lehm (Biofaserlehmputz)
 56 cm wallstärke ohne konv. Folien!
 $u = 0,11 \text{ W/m}^2\text{K}$

GRUNDRISS: INNEN, AUSSEN
 SCHNITT: SENKRECHT
 Planung und Montage mit
 Fertigteil - Konstruktionsprinzip

Source: HfZ-Bericht 29/2005; Meingast, 2005
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Ecological community center Ludesch (V1bg)

Project: Construction of community center in passive-house standard
 Builder: Gemeinde Ludesch, Immobilienverwaltungsgmbh & Co KEG
 Architectur: Architecturbüro DI Hermann Kaufmann ZT GmbH (DI Wehinger)
 Fachplaner: Spektrum GmbH (Dr. Torghele, DI Lerchbaumer), IBO (Mag. Mötzl, Bauer), Fa. Ökoberatung (Bertsch), Büro f. Bauphysik (DI Weithas), SYNERGY consulting & engineering (Ing. Gludovatz), Umweltverband Vorarlberg (DI Studer, DI Lenz), Isozell vertriebsgmbh

Size: 3.135 m²
 Completed: 2005
 Material: timber
 Energy index: 13,80 kWh/(m²a) PHPP
 Heating load: 10,00 W/m² PHPP
 Airtightness n50: 0,5/h

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Ecological community center Ludesch (V1bg)

Aim
 Multifunctional building complex completely in wood in passive-house standard.

- Integral Planning: user serviceability, social and space compatibility, urban development, economical exposure to ground and energy, reasonable application of ecological building materials, compliance with budget
- Intensive public participation
- Costs: cca. 2% additional costs to conventional building
- Ecology: Passive-house, timber construction, PV- and solar facility
- Rain water usage
- Multifunctionality: multifunctional utilisation

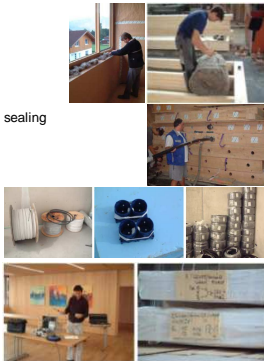
Source: HfZ-Bericht 51/2006; Wehinger et al., 2006

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Ecological community center Ludesch (v1bg)

ÖKOLOGISCHE BAUSTOFFE:

- Timber light weight construction**
 - Transport
 - Uncoated: oiled parquet; untreated façade
- Sheep wool:** Heat + acoustic insulation, windows sealing
- Cellulose:** Thermal insulation of outer walls
- Prevention of contaminants:**
 - PVC, PU, dissolver
 - 3layer-board instead OSB
- Quality control (Management of chemicals)**
 - Product-Declaration list
 - Building site controlling
 - Compartment air measurement: Formaldehyd, VOC



Source: HzZ-Bericht 51/2006; Wehinger et al., 2006

Schadstoffmessung | Materialkennzeichnung (MK)

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Ecological community center Ludesch (v1bg)

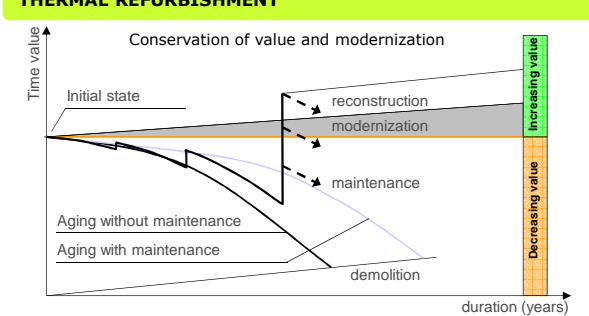


Insulation: Sheep wool

Source: 079419_vortrag_beresch_dornbirn_gz-ludesch.pdf

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THERMAL REFRUBISHMENT



Conservation of value and modernization

Initial state

reconstruction

modernization

maintenance

Aging without maintenance

Aging with maintenance

demolition

duration (years)

increasing value

Decreasing value

-> BEFORE demolition of building -> Proving alternatives
 -> Combination of functional, architectural, aesthetic measures + thermal refurbishment measures

[Source: FECHNER, J. (Ed.) (2002) Altbau modernisierung – Der praktische Leitfaden. Vienna: Springer]

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HIGH SCHOOL HAIZINGERGASSE

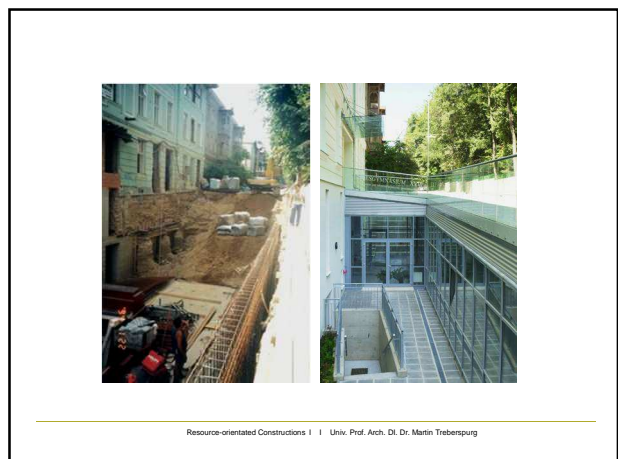
Hainzinger gasse 37, 1180 Vienna
 OLD BUILDING MODERNISATION – SCHOOL RECONSTRUCTION

1.808 m² before
 4.986 m² after

OBJECT DATA

Type:	School Building Reconstruction and Rebuilding
Constructor:	BIG GmbH
General Planning:	Treberspurg & Partner ZT GmbH
Completed:	2000
Dimension:	ca. 5.000 m ²
Netto Building Costs:	ca. 7,27 Mio. EURO

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Passive house-school refurbishment, Schwanenstadt, A-4690

Constructor: Stadtgemeinde Schwanenstadt, Schwanenstadt
 Builder: Neue Heimat OÖ Stadterneuerungsgesellschaft mbH, Linz
 Planning: Plöderl.Architektur.Urbanismus. PAUAT Architekten, Wels



Before

After

Source: HdZ-Bericht (22/2004) Lang, Plöderl, et al. 2004

Resource-orientated Constructions | Univ. Prof. Arch. DI. Dr. Martin Treberspurg

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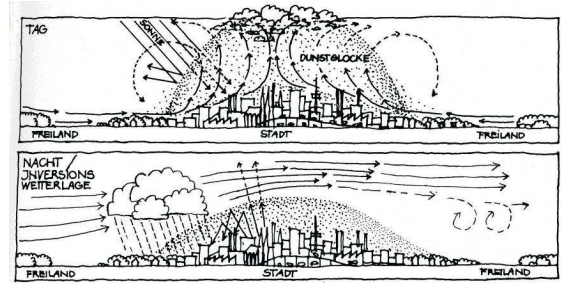
Source: HdZ-Bericht (22/2004) Lang, Plöderl, et al. 2004
 Photos: Petra Blauensteiner

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Green roofs

Zelená architektúra | Dipl.-Ing. Roman Grüner

City climate



Folgen der städtischen Überwärmung bei Tag, Nacht und Inversionswetterlage [Source: KRUSCHE 1982]

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City climate

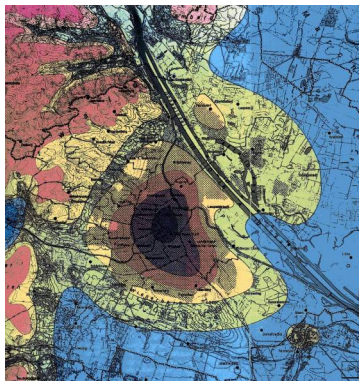
PLANUNGSGRUNDLAGEN FÜR WIEN
Abbildung 10,
TYPISCHER WÄRMEEISEL



Quelle: Das Klima von Wien – Projekt ZA 1. Mai u. Geogr. in Zusammenarbeit mit MA 38 und MA 48
Ersch.: 1. Ausg. B. Böhm, ZA 1. Mai u. Geogr.
Grundkarte: Stadtplan von Wien nach dem Österreichischen De-
partement Wien, 1868/1869, ergänzt durch MA 38
Kartographie: G. H. Fischer, Institut für Stadtebau

Städtische Wärmeinsel am Exemple Wiens [Source: AUER, BÖHM, MOHNL 1989]

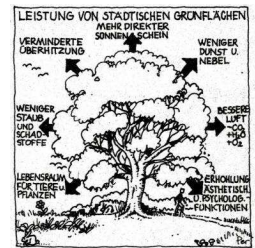
Resource-orientated Constructions | Univ. Prof. Arch. DI. Dr. Martin Treberspurg



City climate

Improvement of the city climate with:
• active and passive utilization of the solar radiation (solar collectors, winter gardens) and usage of accumulation capacities of the housing properties through resource- and energy preserving materials (passive house technologies) according to the principles of the solar building

- Creation of sufficient vegetation and water areas especially in dense urban area e.g. through roof and façade green areas, as well as parks over garages.
- Creation of small scale air circulations, that provide fresh air and cooling
- Prevention of imissions through traffic, industry and households



Leistung von städtischen Grünflächen [Source: KRUSCHE 1982]

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History - Antike

Wonder of the world
„Hanging Gardens of Semiramis“ in Babylon, ca. 600 B. C.

Constructor King Nebukadnezar II.



Künstlerische Interpretation von Maarten van Heemskerck, 16. Jhd.

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History – Secular buildings

- „Islands grass-houses“
- long tradition in rural secular building
 - especially in extreme climate zones
 - through roof structure adjustment of temperature fluctuation



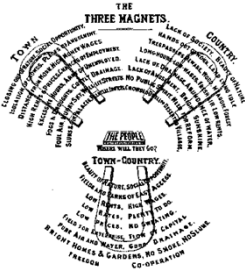
Rekonstruiertes GrassodenHouse in Skagafjörður, Island [Source: icelandreview]

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History - Moderne

„Garden cities“

- Model by Ebenezer Howard in 1898
- Model of planned city development as reaction to bad living conditions and increasing land price in large towns
- Reestablished in surroundings of bigger cities
- Consist of several independent parts, divided through wide agrarian zone, connected with trains
- Usage segregation: concentrical alignment of functions (inside out: public facilities – living – industry), detached through large green belts



Ebenezer Howard's "Three Magnets" diagram, 1898 [Source: wikipedia]

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History - Moderne

Adolf Loos
„House Scheu“, Larohegasse 3, 1130 Wien

- Single-family house
- Build: 1912-1913
- Principles of terracing
- Every bedroom has an east orientated terrace
- At that time: Hard conflict with building authorities



View Garden facade Gartenfassade [Source: SARNITZ 2003]



View street facade [Source: ERTL]

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History- Moderne

Le Corbusier
„House Savoie“ in Poissy, 1929
• Villa with roof terrace



Skizze Le Corbusier [Source: BOESIGER 1998]



Roof terrace [Source: d_floor]



WestCornere [Source: archINFORM]

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History - Moderne

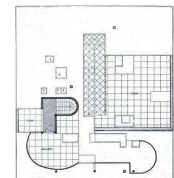
Le Corbusier
„House Savoie“ in Poissy, 1929



Roof terrace [Source: BOESIGER 1998 + d_floor]



Saloon with view on roof terrace [Source: BOESIGER 1998 + d_floor]



Top floor [Source: BOESIGER 1998]



Living floor [Source: BOESIGER 1998]

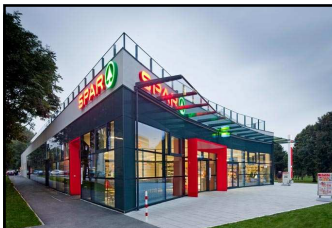
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Spar Supermarket



Engerthstraße 230A, 1020 Vienna
Used space: 684 m²
Green space: 1.105 m²
- 230 m² for sport

Green architecture | Dipl.-Ing. Roman Grünner



Green architecture | Dipl.-Ing. Roman Grünner

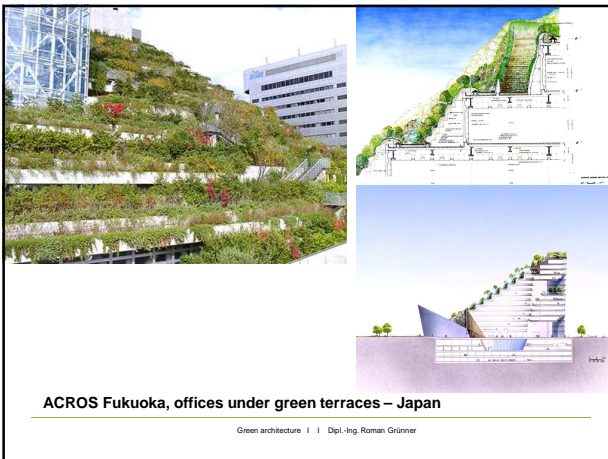


Green architecture | | Dipl.-Ing. Roman Grüner



ACROS Fukuoka, offices under green terraces – Japan

Green architecture | | Dipl.-Ing. Roman Grüner



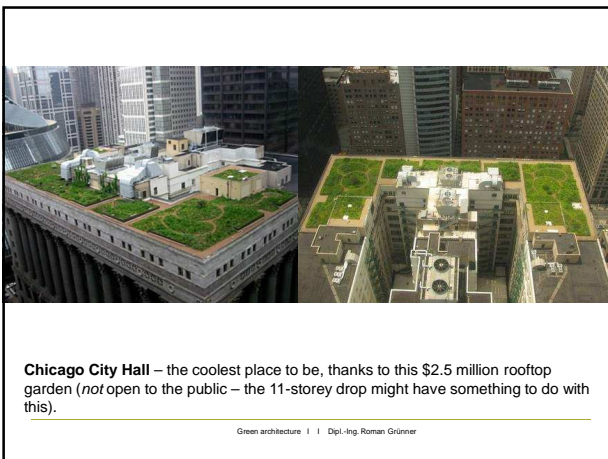
ACROS Fukuoka, offices under green terraces – Japan

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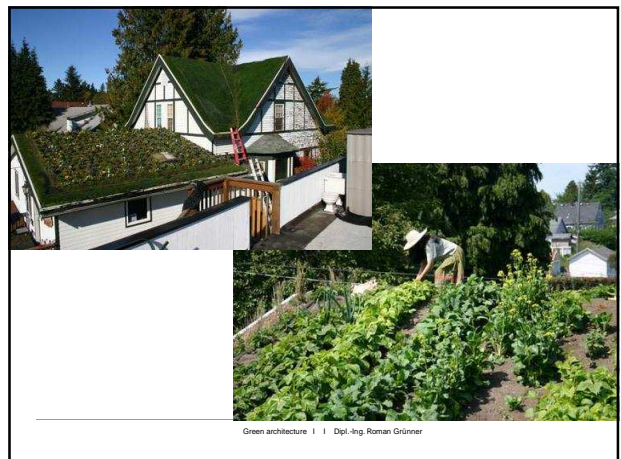
Art and Exhibition Hall roof garden – Bonn, Germany.

Green architecture | | Dipl.-Ing. Roman Grüner



Chicago City Hall – the coolest place to be, thanks to this \$2.5 million rooftop garden (*not open to the public – the 11-storey drop might have something to do with this*).

Green architecture | | Dipl.-Ing. Roman Grüner



Green architecture | | Dipl.-Ing. Roman Grüner

Africký hotel so zelenou strechou



Toyota Roof Gardens

Green architecture | | Dipl.-Ing. Roman Grünner

Green walls

Green architecture | | Dipl.-Ing. Roman Grünner

Grünwand



Green architecture | | Dipl.-Ing. Roman Grünner

Grünwand

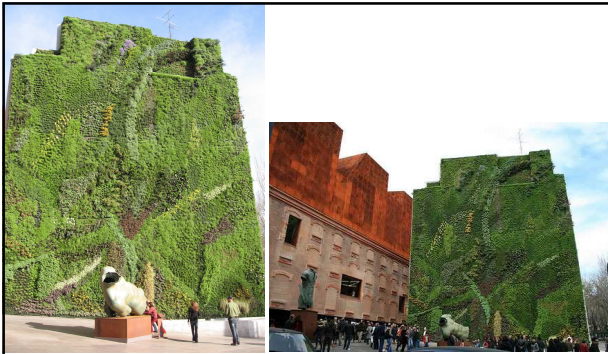


Green architecture | | Dipl.-Ing. Roman Grünner

Grünwand

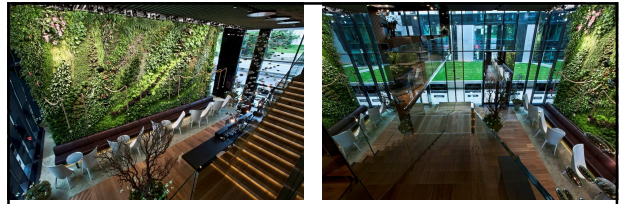


Green architecture | | Dipl.-Ing. Roman Grünner



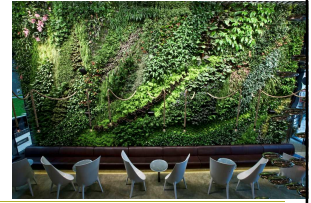
CaixaForum, Museum in Madrid

Green architecture | | Dipl.-Ing. Roman Grünner



J&T Bank Cafe, Bratislava

Green architecture | | Dipl.-Ing. Roman Grünner



Plants don't need earth: only water, minerals, light and carbon dioxide". Based on this simple axiom, Patrick Blanc built his first vertical garden in 1988, specifically in La Villette in Paris.

Green architecture | | Dipl.-Ing. Roman Grünner

Belgická zelená budova s vertikálnymi záhradami



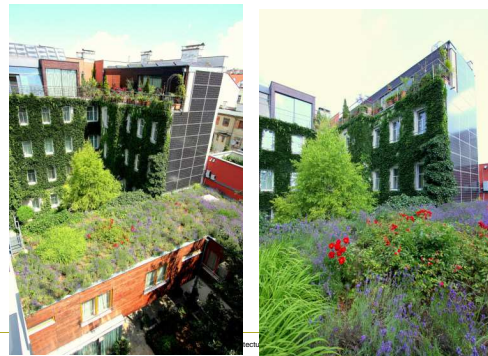
Belgická zelená budova s vertikálnymi záhradami



Linkebbek, Belgicko

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Boutiquehotel Stadthalle



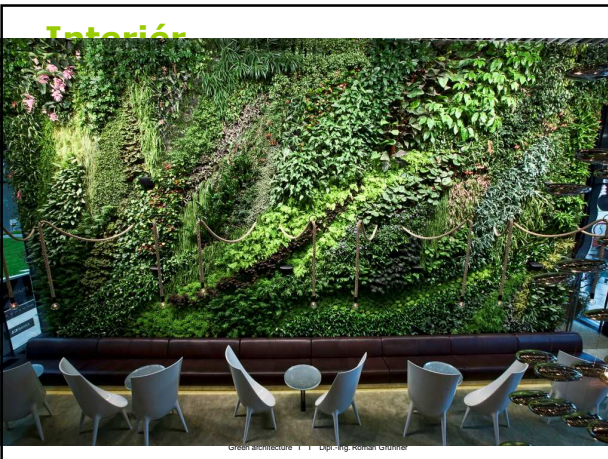
Zelený interiér

Green architecture | | Dipl.-Ing. Roman Grünner



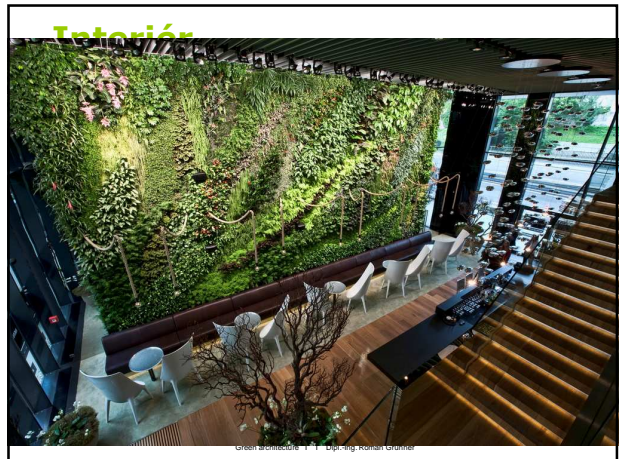
Interiér

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Interiér

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Green Bridges

Green architecture | | Dipl.-Ing. Roman Grünner

Green Bridges



Green architecture | | Dipl.-Ing. Roman Grünner

Green Bridges



Green architecture | | Dipl.-Ing. Roman Grünner

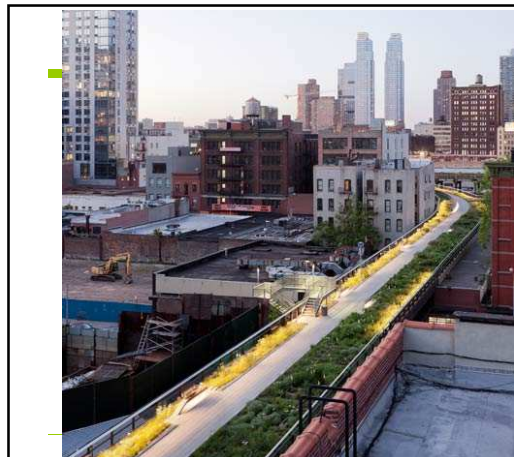


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High line, New York



Green architecture | | Dipl.-Ing. Roman Grünner





Green architecture | | Dipl.-Ing. Roman Grünner

Le Viaduc des Arts, Paris

Green architecture | | Dipl.-Ing. Roman Grünner

Le Viaduc des Arts, Paris

Green architecture | | Dipl.-Ing. Roman Grünner

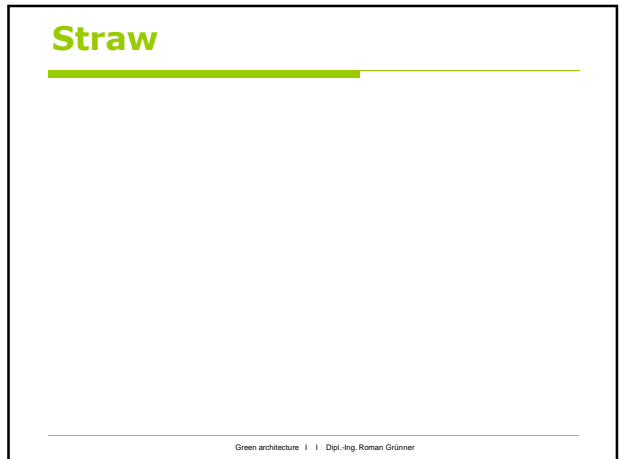
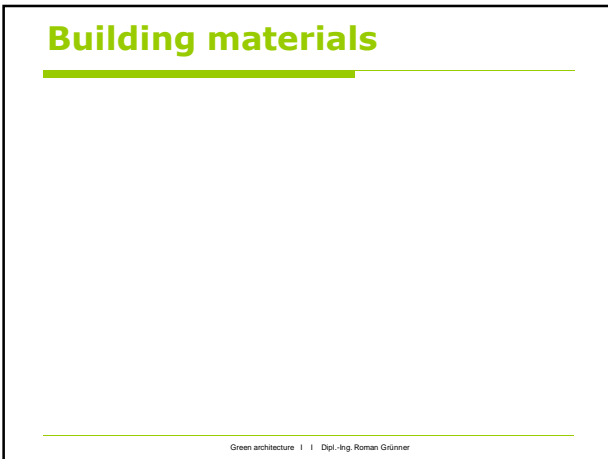
Zelený Starý most

Zelený Starý most

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Old Green Bridge

Green architecture | | Dipl.-Ing. Roman Grünner



VYUŽITÍ BALÍKŮ ZE SLÁMY KE STAVBĚ PŘIŠLO Z NEBRASKY

Aleš Brotánek

POŽÁRNÍ ODOLNOST F 120 minut

- ① -vnitřní jílová omítka
- ② -napínací drát nebo lanko
- ③ -fošnový věnec
- ④ -rubičové pletivo
- ⑤ -prkenné okenní ostění
- ⑥ -slaměné balíky 133 kg/m³
- ⑦ -táhla z armatury probíhající do věnce
- ⑧ -hydroizolace
- ⑨ -venkovní difúzní vápenná omítka

**V USA
- SLÁMA
JAKO
NOSNÝ
PRVEK**

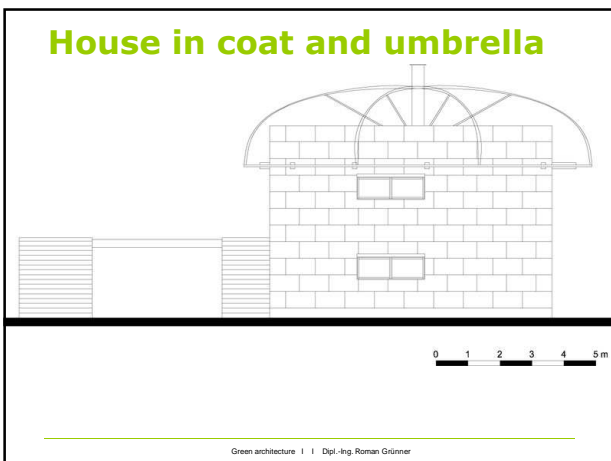
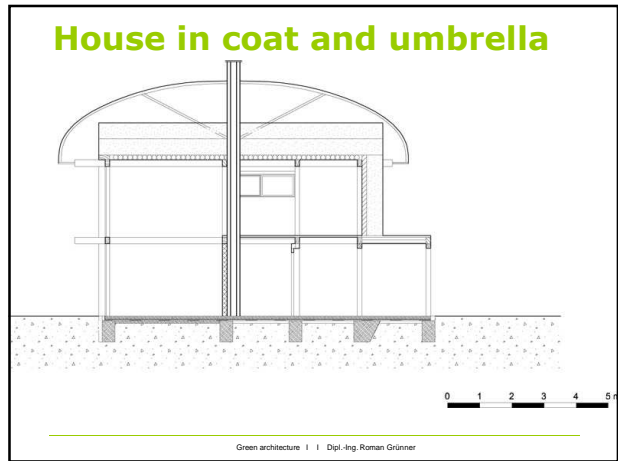
BALÍKY SLÁMY POUZE JAKO NENOSNÁ IZOLACE V EVROPĚ

Aleš Brotánek

POŽÁRNÍ ODOLNOST F 90 minut

- ① -kontroláté
- ② -závětrná papírová fólie
- ③ -venkovní modřínový obklad
- ④ -větrující prkenný základ
- ⑤ -slaměné balíky 90 kg/m³
- ⑥ -fošňková voštinová nosná kostra
- ⑦ -vnitřní prkenný základ protisměrně větrující
- ⑧ -rákosové rohože
- ⑨ -vnitřní vápenná nebo jílová omítka

**rakouský
model
-výplň ze
slámy v
nosné
konstrukci**



House in coat and umbrella

Architekt: Peter Suske
 Investor: Josef Šulc
 Místo stavby: Mladá Boleslav – Michalovice, Česká republika
 Doba stavby: 2001 – 2002
 Dodávatel: BES s.r.o.
 Cena stavby: 1.500.000,-Kč = okolo 61.249 eur (vlastná výroba hlinených tehál-vhodná sprašová hlína z miesta stavby, slamené balíky zadarmo z blízkeho poľa, kúpeľne z akciového výpredaja v Baumaxe)

Materiály: Slama – tepelná izolácia Nepálená hlína – tepelne akumuláčnè interiérové múrivo Drevo – konštrukčný materiál

Vykurovanie: pasívne solárne + plynový kotol a jeden radiátor (plynový kotol aj na prípravu TUV)

Obstavaný priestor: 496 m3 Podlahová plocha: 123 m2

Green architecture | | Dipl.-Ing. Roman Grünner

Bus stop from straw



Green architecture | | Dipl.-Ing. Roman Grünner

Low energy dome



Green architecture | | Dipl.-Ing. Roman Grünner



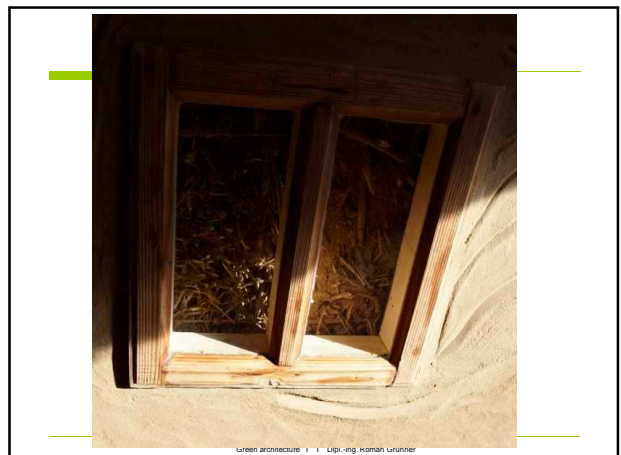
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