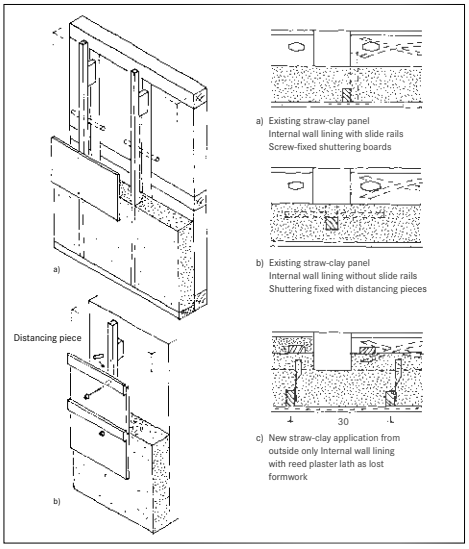

Fig. 201 Internal wall lining for renovation of a half-timbered structure

Fig. 202 Woodchip light earth internal wall lining compacted behind reed plaster lath as lost formwork

Fig. 203 Woodchip light earth internal wall lining compacted behind sliding formwork

Fig. 204 Manual application smoothed with a float. The thickness of the vertical lath determines the thickness of the plaster. Closing the gaps with the same material

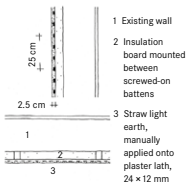

Fig. 205 Internal insulation, clad with straw light earth applied manually

historical timber-frame and half-timbered constructions. Light earth wall linings are one of the few problem-free ways of insulating the inner surface of external walls, and have been used successfully in the renovation of countless half-timbered structures.

Moisture damage through the occurrence of condensation water within the wall structure is not a concern with this kind of "internal insulation". According to DIN 4108-3 2014, the calculation of the dew point is not necessary as long as the wall consists of normal capillary conductive building materials such as artificial stone, brick or earth.

Care must be taken with less capillary conductive building materials, for example clinker brick, and a dew point calculation is then recommended. Internal vapour barriers should be avoided, as should air cavities between the earth wall lining and the external wall, as this interrupts the moisture transport and prevents the wall from effectively dissipating moisture (see chapter 825).

454 Internal insulation applied to lathwork

With this construction, a timber supporting construction is mounted on the internal face of an external wall between which a capillary conductive fibrous insulation material can be inserted. Laths are then fixed to these supports at regular spacings as described earlier under walls and roofs (see chapters 425 and 445). A malleable straw light earth mass is prepared and either thrown or daubed onto the lath and smoothed with a float to form a 25 to 30 mm thick layer. Vertical plaster laths fixed temporarily to the cross battens can be used to ensure the surface is flat and plumb (see figs. 204 and 205).

460 Spray application approaches

Plastering machines can be used to mix earth and light earth mixes with fine fibres, and then to pump and finally spray-apply the mix onto wall surfaces. Suitable backings or plaster bases include tightly spaced battens or laths, solid wall surfaces such as

544 Stacked walls

Stacked external walls

In lightweight insulated timber constructions, stacked wall linings made of earth or light earth bricks improve the thermal mass, noise insulation and room acoustics. Walls do not sound hollow. With this method, bricks or panels are laid dry without mortar avoiding the introduction of moisture into the building construction. Where such wall linings are placed in front of wooden sheathing or boards, flat wooden battens are laid horizontally every three to four courses and screwed to the backing to clamp the bricks in place. The plaster base, for example open reed lath, is likewise fixed to these battens (figs. 239 and 240).

A machine-applied earth plaster adheres through the plaster base to the bricks behind. Alternatively, the wall lining can be clad with earth building boards (fig. 241) and coated with a thin layer of plaster. Electrical cabling can be routed in this layer, as the layer of internal plaster provides reliable wind proofing of the timber frame wall.

Figure 238 shows prefabricated timber frame elements with plywood sheathing on one side that have been filled internally with light earth bricks laid on edge in a thin bed of mortar with open vertical joins. To prevent the bricks from dislodging, thin horizontal planks have been laid every few courses that have notched ends to fit the triangular battens fixed to the vertical timber studs. An undercoat plaster is spray-applied to the entire wall surface – brick infill and timber posts – and a plaster rein-

Fig. 238 Stacked internal wall lining in timber frame panels coated with a layer of undercoat plaster (see project 9)

Fig. 239 Prefabricated timber frame house with stacked earth brick internal wall lining (Paproth)

Fig. 240 Dry laid bricks with reed plaster lath (Paproth)

Fig. 241 Stacked internal wall lining clad with earth building board (Claytec®)

Fig. 242 Stacked internal wall lining (see project 27)

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19 Prajna Yoga Studio in New Mexico (USA)

Santa Fe, New Mexico, 2008
Architects: Paula Baker-Laporte, EcoNest Architecture
Technique: Straw light earth in shuttering (LSC Wall System)
Earth building works: EcoNest Building Company, Robert Laporte

The floor plan design, dimensioning and orientation follow the architectural and building tradition of Japanese Zen and Indian Sthapatya Veda. The LSC (Light Straw Clay) Wall System is a custom system developed by Robert Laporte and has been perfected since the 1990s in successive projects and workshops. It comprises a combination of the use of tumbler, mixer, silo, forklift and hoppers to prepare and load the material and an innovative framework and shuttering system for producing the walls. The characteristic EcoNest Architecture is inspired by Japanese houses with exposed timber frame in the interiors and smooth earth plaster surfaces, and is carefully detailed from beginning to end.

Fig. 464 LSC System with ladder stud construction for the straw light earth external walls

Fig. 465 External wall with full-surface shuttering on the internal face and external sliding formwork

Fig. 466 Wide scaffold with aluminum walkboard for filling the upper wall sections

Fig. 467 Typical LSC corner detail with ladder studs and inserted bamboo reinforcement bars

Fig. 468 Meditation room

Fig. 469 Floor plan (architect: Econest, redrawn)

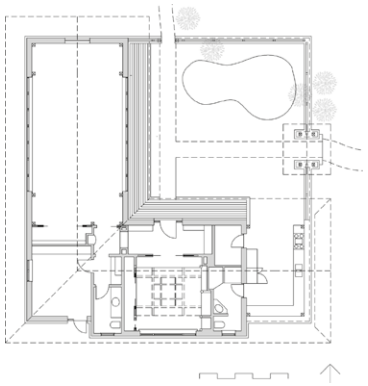
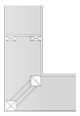


Fig. 470 Construction of the light earth external walls (Econest, redrawn)



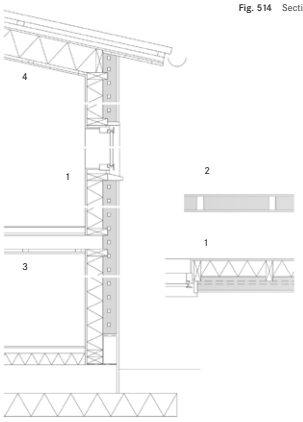


Fig. 514 Section through façade

1 External wall
Timber panel wall construction, stiffened with gypsum fibreboard on the internal face, cellulose insulation on the interior, light earth, 1,000 kg/m³, manually applied onto laths on the exterior face. External lime render.
t = 29 cm, U = 0.24 W/m²K, Ω = 190 kJ/m²K

2 Internal wall
Timber panel wall construction, lined on both faces with gypsum fibreboard, dry stacked wall infill with extruded earth bricks, 1,800 kg/m³.

3 Floor
Parquet flooring, floating screed, glulam floor, gypsum fibreboard mounted on supporting battens

4 Roof
Gypsum fibreboard mounted on supporting battens, cellulose insulation between rafters, sheathing, fibre-cement roof covering

Fig. 515 Erection of timber panel elements

Fig. 516 External walls, 12 cm light earth, internal walls with stacked earth bricks

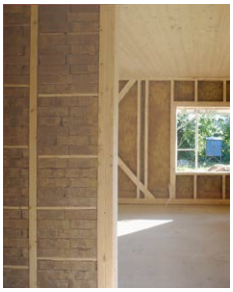


Fig. 517 Continuous application of light earth on battens under the already complete roof with larch wood window jambs already in place

Fig. 518 Corner detail showing the battens of the light earth skin

Fig. 519 View from the south

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