



1st International Hemp Building Symposium

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some advantages by application of vegetable building materials like hemp



By using regenerating raw construction materials based on hemp **one preserves natural resources** and avoids the high energy expenditure and the landscape destruction with the dismantling and the transformation of these non renewable sources is connected.

Hemp is suitable to **improve on soils**, can be cultivated **free of pesticide and free of herbicide** and from which all parts are usable. **There is no waste.**

When building with vegetable materials **one holds back CO2 and reduces thus the environmental impact.**

By working with hemp in the whole enclosure of a building, about 100 kg hemp gets applied per m², with what **one replaces and avoids toxic- and not environmental-friendly materials.**

Using Hemp in construction leads to an **excellent thermal, acoustic and bio-climatic comfort.**



hemp-felt



insolating panel

building materials: hemp fiber or hurds?



Cannabric



granulated hemp

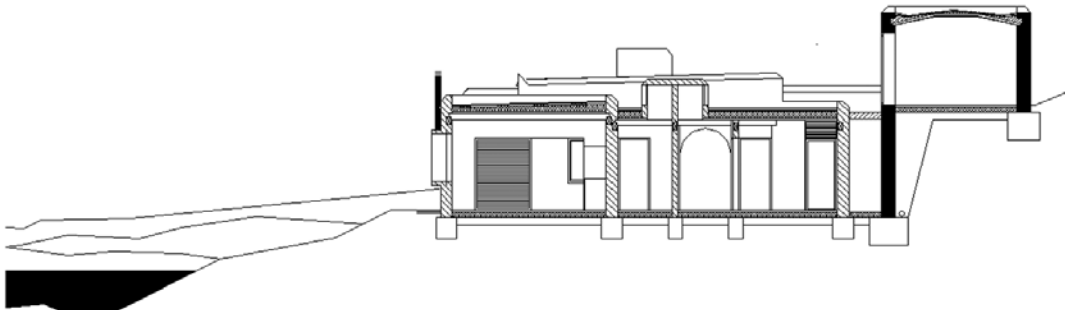
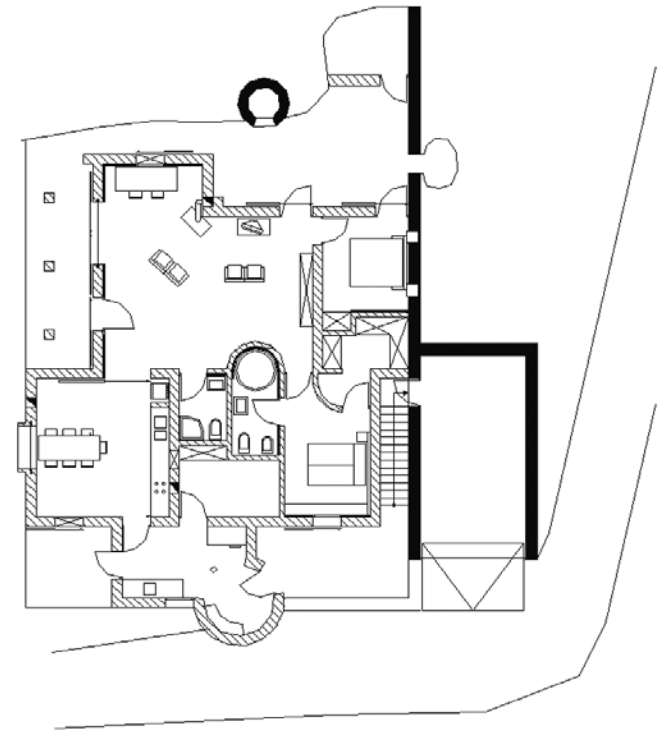
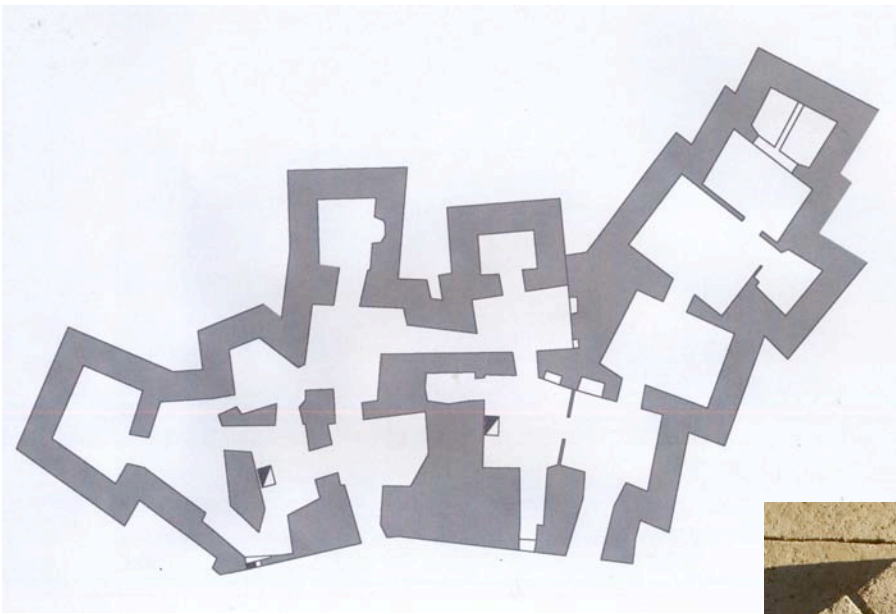




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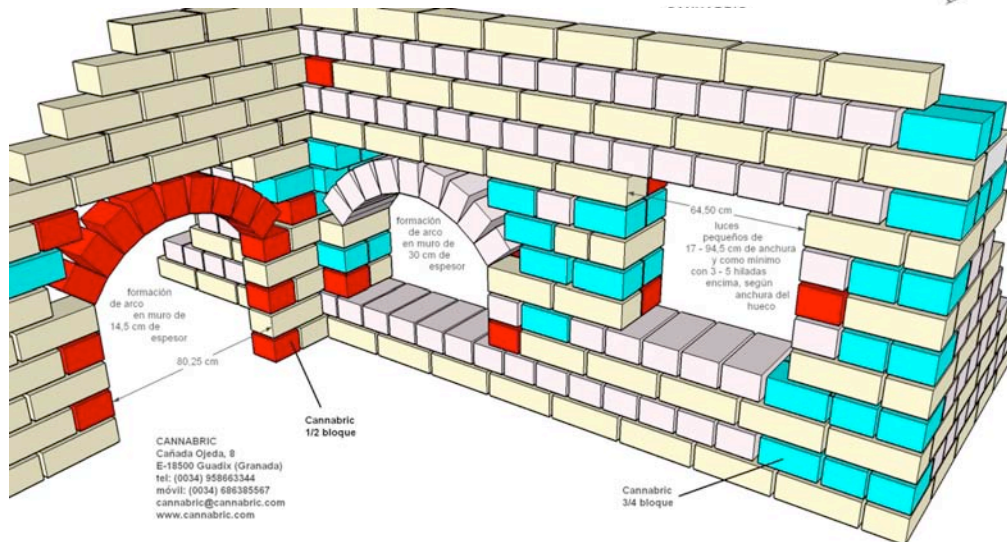
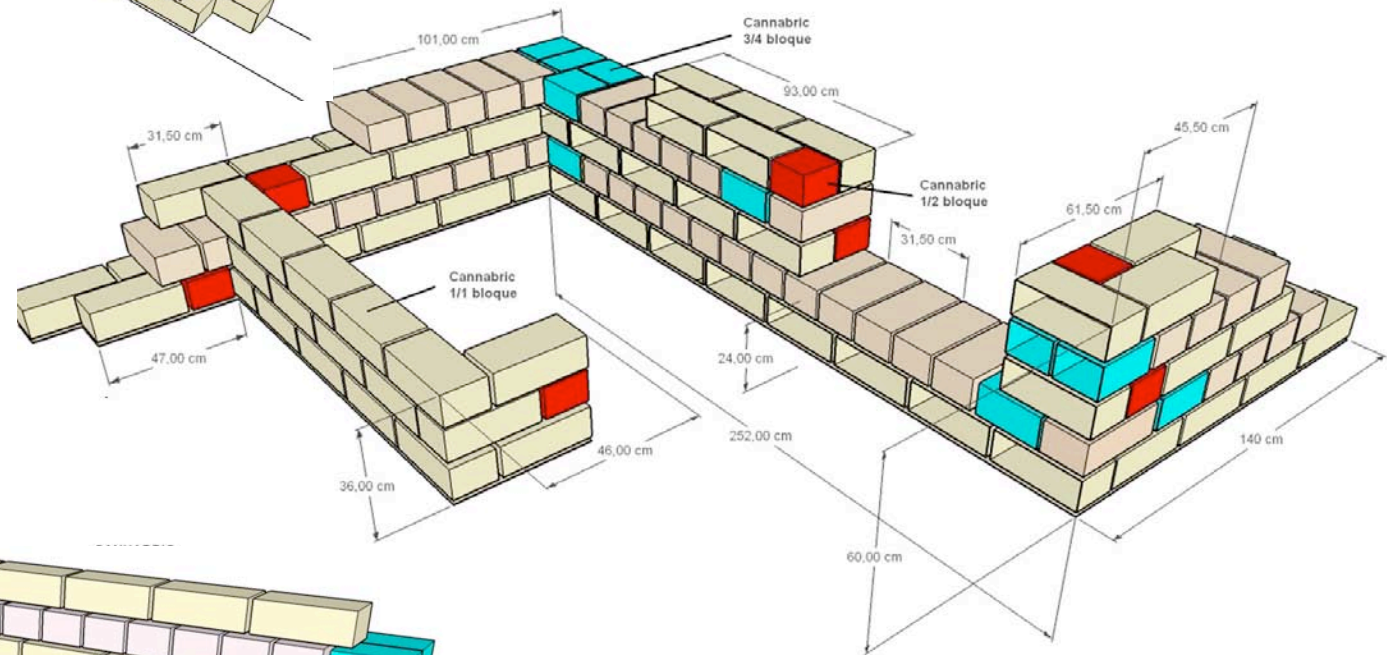
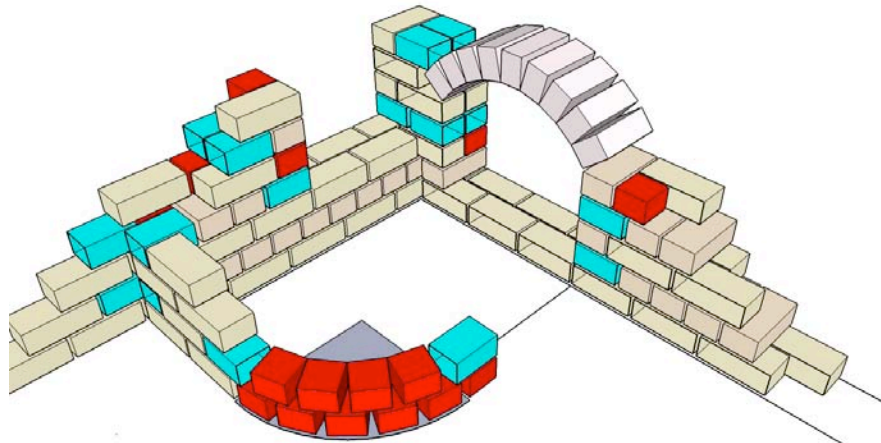


THERMAL PROPERTIES of various materials in the comparison:

material	specific thermal coefficient	density	heat accumulating capacity (thermal inertia)	thermal conductivity	heat transition coefficient with 30 cm wall thickness
	kcal/kg °C	kg/m ³	kcal/m ³ °C	W/m.K	W/m ² .K
water	4,19	1000	4190	0,6	(1,49)
ice	2,1	916	1923	0,59	1,47
steel	0,4	7850	3140	60	
dry earth (loam stone, cave)	0,89	1800	1602	0,91	2,0
CANNABRIC	1,103	1171	1291	0,19	0,57
pine wood	1,9	600	1140	0,13	
light loam stone	1	1000	1000	0,35	0,97
corc panel	1,5	450	675	0,07	
glass	0,34	2200	750	1,4	
lime mortar/ render	0,33	1800	(>) 600	0,87	1,94
granite	0,2	2645	529	3,5	
massif fired brick	0,3	1600	480	0,96	2,07
sandstone	0,17	2200	374	1,3	
cement mortar/ render	0,16	2300	368	1,4	2,6
straw ball	1,4	250	350	0,1	
gypsum plaster	0,2	1440	288	0,7	
hollow (light) fired brick	0,19	910	173 (air chambers)	0,29	0,83
cement bloc	0,2	585	117 (air chambers)	1,15	2,32
isolation panels from wool	0,32	111	35	0,04	
poliurethane	0,38	24	9	0,03	
air	1,01	1,2	1,21	0,13	



<p align="center">CANNABRIC compared to:</p>	<p>bricks and blocks for conventional building</p>
<p>made of environmental friendly materials (renewable or recycling)</p>	<p>using non renewable resources</p>
<p>non fired brick, manufactured with low energy need</p>	<p>fired or highly transformed</p>
<p>air died brick, which keeps alive bio-climatic properties: natural regulator of humidity and temperatures</p>	<p>are at least 10% less able to breathe and have less or zero humidity regulating properties</p>
<p>leads to optimum thermal and acoustical results with minimum wall thickness and buildings with low energy expenses</p>	<p>low thermal and acoustical comfort high energy need for heating and refrigeration</p>
<p>one layer system (one material satisfies all the functions of a wall): - cost saving way of building which allows using high quality materials - no need of additional thermal or acoustical insulation</p>	<p>more layers necessary (adding insulation) which may cause condensation problems</p>
<p>massif wall system: suitable for hot and cold climate, takes advantage of several thermal properties</p>	<p>air chambers don't lead to thermal inertia</p>
<p>the long lifetime of natural materials make the dwelling usable for more than one generation</p>	<p>rigid, inflexible, losing properties with the time, are made for short lifetime</p>
<p>easy recyclable (one material house-system, not too hard/ vertical construction): grinded it can be used again for bricks or hemp -light -mortar</p>	<p>high recycling expenses for future generation</p>



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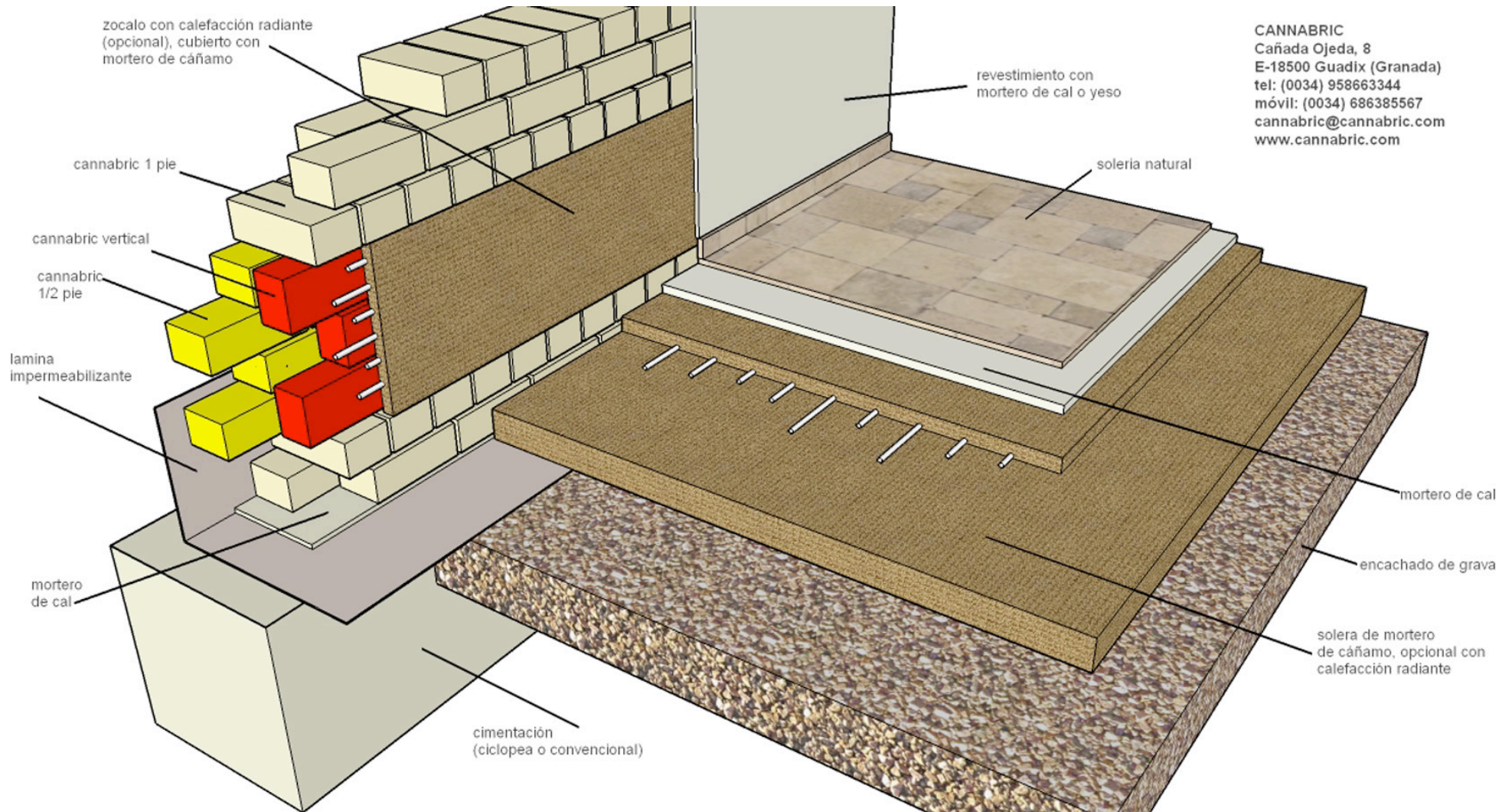






integral hemp – building:

- floor slabs of hempcrete
- massiv load-bearing Cannabric walls
- roof made with hempcrete or insulated with hempfiber-boards

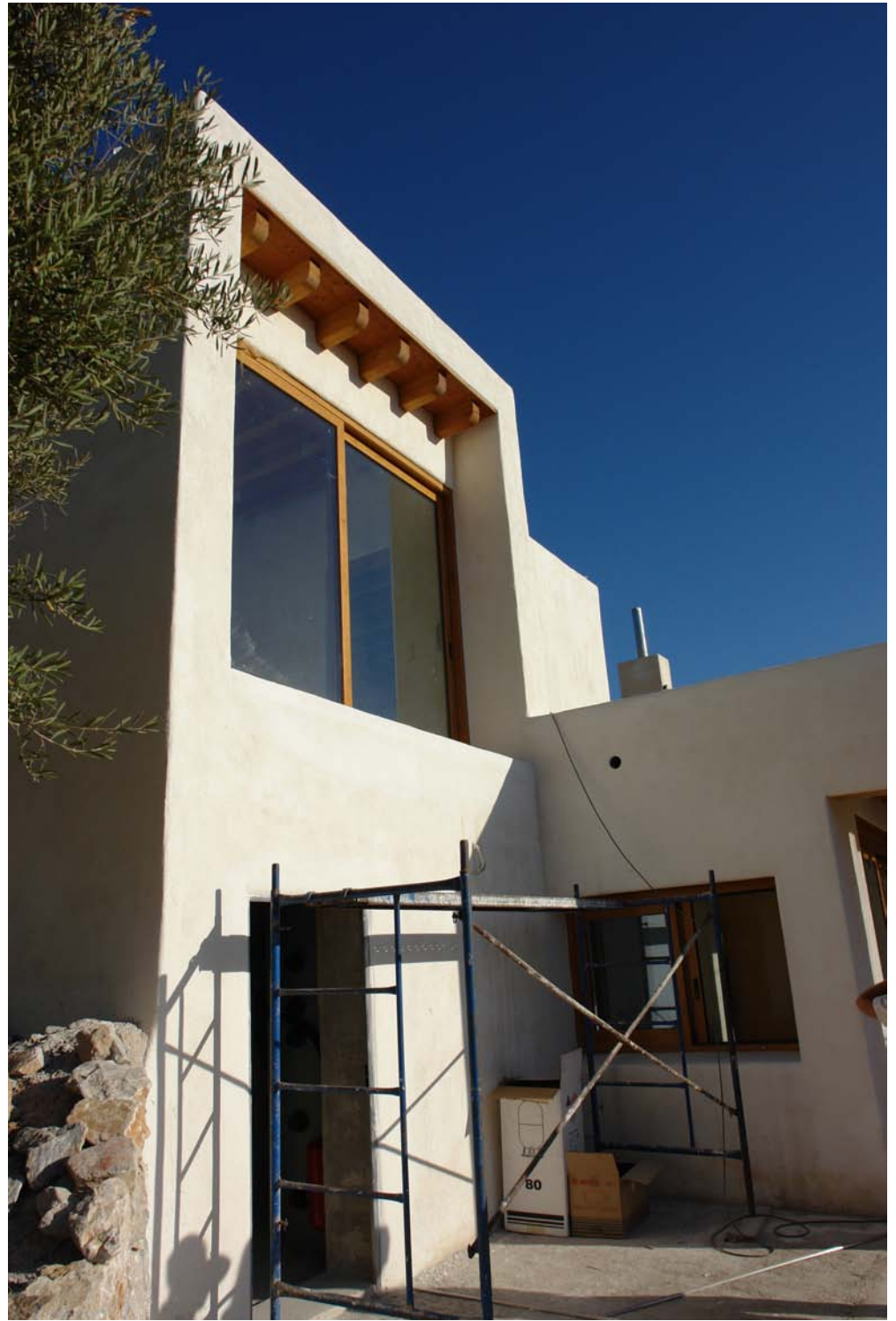


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CANNABRIC WALLS

COMPACTED WALLS OF STRUCTURAL HEMP-MORTAR

PRICE/ M2 LOAD-BEARING WALL, INCLUDING ALL MATERIALS, LABOR (AND MOULD)

about 90 €

about 70 € (only with easy, cubic design).

SUITABLE FOR INTERIOR WALLS

yes

too laborous

CLIMATE

almost all times of the year

warm and dry periods, free of frost

THERMAL QUALITIES

thermal bridge (joints), but low when using lime mortar

no need of mortar , no thermal bridges

DRYING TIME (WALLS OF 30 cm THICKNESS) BEFORE RENDERING

only mortar, up to one month (the bricks are delivered dry or one month old)

3 days before moving the mould (south Spain), 3-4 months, depending on ventilation and temperatures

YELLOW SPOTS IN RENDER AND PLASTER

no, never observed

yes, observed after too short drying period

WASTE

none

mould

EARTH QUAKE RESISTANCE

lower: (brickwork separate from mortar)

no joints, higher and reinforcable







