


10 houses of hemp concrete

by LM Ingénieur / 2017-03-22 16:55:40 / France / 12722 / FR



Extension + refurbishment

Primary energy need :

48.3 kWhep/m².an

(Calculation method : RT 2005)

ENERGY CONSUMPTION

Economical building

< 50	A
51 à 90	B
91 à 150	C
151 à 230	D
231 à 330	E
331 à 450	F
> 450	G

Energy-intensive building

Building

A

Building Type : Collective housing < 50m
Construction Year : 2014
Delivery year : 2015
Address 1 - street : 9 rue de la Folie 78350 LES LOGES EN JOSAS, France
Climate zone : [Cfb] Marine Mild Winter, warm summer, no dry season.

Net Floor Area : 1 203 m² SHON
Construction/refurbishment cost : 2 550 000 €
Cost/m2 : 2119.7 €/m²

General information

The project consists of the construction of 10 individual houses for sale, of which 2 are social. The rehabilitation and extension of a built complex to house 10 housing units in the heart of a village of character raises the question of the transformation of an old rural structure and its adaptation to contemporary uses. Mixing both rehabilitation and new construction works, this project was guided by an ecological ambition and strong technical constraints. The method we have developed here is both respectful of the Loges-en-Josas and the landscape of the Bièvre valley, and ambitious in its environmental approach.

Sustainable development approach of the project owner

Energy-efficient construction. Control of the environmental weight of the operation. Quality of interior comfort level

Architectural description

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accommodations are accessible from the central common courtyard. The private gardens are located on the other side of the central area, yet with a communal garden in the extension of the gardens to the north. This common garden makes it possible to make disappear the sequence of the private gardens behind a large hedged bocage in boundary. The 20 parking spaces are distributed and skilfully integrated in the outdoor spaces or in covered spaces. The ground floors of the houses organized around the humid rooms leave visual transparencies from the courtyard to the garden.

Stakeholders

Stakeholders

Function : Contractor

SCI Vallée de la Bièvre

7 Avenue Descartes - 92350 Le Plessis Robinson

Function : Designer

Dumont Legrand Architecte

1 rue du Lieuvin - 75015 Paris

<http://dumont-legrand.fr/>

Project manager

Function : Other consultancy agency

LM Ingénieur

Laurent Mouly - 13, rue Chapon - 75003 Paris - Tél : 01 40 29 96 92

BET Structure, Thermal and Envelope

Function : Other consultancy agency

ATELUX

13,Rue du Clos d'en Haut - 78700 Coflans-Saint-Honorine

<http://atelux.fr/>

Fluid Design Office

Function : Company

JR BAT

20 rue Pierre Mendès France - 77200 Torcy

General Enterprise

Type of market

Realization

Energy

Energy consumption

Primary energy need : 48,30 kWh_{ep}/m².an

Primary energy need for standard building : 130,00 kWh_{ep}/m².an

Calculation method : RT 2005

Breakdown for energy consumption : Heating: 21.8 DHW: 17.8 Lighting: 6.2 Auxiliary: 2.6

Initial consumption : 48,30 kWh_{ep}/m².an

Real final energy consumption

Final Energy : 43,00 kWh_{ep}/m².an

Envelope performance

Envelope U-Value : 0,36 W.m⁻².K⁻¹

More information :

Timber frame, filling hemp concrete
Exterior lime plaster with Fermacell panels

Building Compactness Coefficient : 0,84

Indicator : I4

Air Tightness Value : 0,85

Renewables & systems

Systems

Heating system :

- Individual gas boiler
- Wood boiler

Hot water system :

- Individual gas boiler

Cooling system :

- No cooling system

Ventilation system :

- Single flow
- Humidity sensitive Air Handling Unit (Hygro B)

Renewable systems :

- Wood boiler

Solutions enhancing nature free gains :

Enveloppe performante, bioclimatisme.

Environment

Urban environment

Land plot area : 5 343,00 m²

Built-up area : 22,50 %

Green space : 1 480,00

ARCHITECTURAL FIGURES The constructions made, with rights-of-way and templates close to those of the existing buildings, are located nearest to the existing site. The North Building Corps is thus located in alignment with the north boundary line leading to rue de la Folie in Parcel 107. The west building is located on the right-of-way of the existing building. This layout preserves the common central space, which then becomes both a serving place and a space shared by the inhabitants. **DISTANT VIEW** The will is to create a harmonious built front, visible from the bottom of the village, thus agreeing with the neighboring bourgeois house as with the meadow in the foreground. The striking figure of the Grange remains present, by the restoration of its gables between which the new construction is inserted. The maintenance of an unconstructed zone articulating the two building bodies at the bottom of the plot allows to maintain the views towards the village and the valley from the central courtyard. In order to avoid any effect of detached houses, the houses fit into these linear and continuous templates. **VIEW OF THE VILLAGE** In order to preserve as much as possible the perception of the place from the borough, the garage rests on the stone wall existing on the boundary of property, itself restored. For the same purpose, the gauge of the garage restores to the best the template of the existing building while taking into account the constraints related to its new assignment. The parking spaces are thus covered by a double slope roof supported on the existing wall of enclosure. At the level of the entry on the ground, the roof, higher, is treated in the spirit of a pigeon, recalling the template of the existing building.

Products

Product

Tradical Hemp Concrete

Tradical

contact@bcb-tradical.fr

<http://www.bcb-tradical.com/fr-beton-de-chanvre-pour-une-isolation-naturelle.html>

Product category : Second œuvre / Cloisons, isolation

Contrary to what its name suggests, hemp concrete has nothing to do with traditional concrete. Non-structural, it is installed on supporting framework (generally in wood) is apparent to the historical constructive principles of dense urban environments: constructions with pan of wood and pan of iron. Conjugating the qualities of hemp and lime, it is projected horizontally on a temporary or permanent formwork bottom. It ensures a distributed insulation of the construction, significantly reducing thermal bridges. The hygroscopic nature of hemp gives the walls a healthy and natural breathing, avoiding the effect "tight box". Its inert character improves the comfort of summer and winter. Finally, hemp concrete is not limiting and allows to realize all types of facade (wood cladding, zinc, plaster ...) The use of hemp concrete allows an energy sobriety, a sobriety constructive and an environmental sobriety . On this building, Radical Hemp Concrete is used for 2 applications. In a wall with distributed insulation, it constitutes the walls of the exterior facades walls street and side courtyard. It is applied mechanically in filling between slabs. It is also used in roofing with distributed insulation.

The sensitivity of the developer and the project management team to biosourced materials naturally led them to choose hemp concrete. The skills of the general company in this field have been a real benefit for the project.



Costs

Construction and exploitation costs

Cost of studies : 210 000 €

Total cost of the building : 2 000 000 €

Carbon

GHG emissions

GHG in use : 7,20 KgCO₂/m²/an

Methodology used :
RT 2005

GHG before use : 48,00 KgCO₂ /m²

Building lifetime : 100,00 année(s)

, ie xx in use years : 6.67

GHG Cradle to Grave : 765,00 KgCO₂ /m²

Life Cycle Analysis

Eco-design material : Structure and timber framing Complete insulation of the hemp concrete casing Insulation of wooden interior floors

Contest

Building candidate in the category



Bas Carbone



Coup de Cœur des Internautes



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