Construction of 15 collective social housing units in hemp concrete

by Christine Désert / 2023-03-21 00:00:00 / France / 1070 / FR

New Construction

Primary energy need :
41.72 kWhep/m².an
(Calculation method : RT 2012)

Energy Consumption
Economical building

<table>
<thead>
<tr>
<th>Energy-intensive building</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Type : Collective housing &gt; 50m</td>
</tr>
<tr>
<td>Construction Year : 2021</td>
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<tr>
<td>Delivery year :</td>
</tr>
<tr>
<td>Address 1 - street : 81 rue de Bellevue 92100 BOULOGNE-BILLANCOURT, France</td>
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<tr>
<td>Climate zone : [Cfb] Marine Mild Winter, warm summer, no dry season.</td>
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</tbody>
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| Net Floor Area : 790 m² Autre type de surface nette |
| Construction/refurbishment cost : 1 693 265 € |
| Number of Dwelling : 15 Dwelling |
| Cost/m² : 2143.37 €/m² |

Certifications :

General information

New construction of housing with an innovative material, hemp concrete, which is used here for the first time on an G+8. This is projected onto a Fermacell formwork base, plated on a secondary wooden frame, itself fixed to a primary concrete frame. Non-structural, hemp concrete gives the project great thermal comfort and comfort in use.

Building users opinion
We recently met a family living in the building for a film shoot, made up of a couple and an infant. They told us that they found the apartments well designed, well sized. They appreciate the through side of the housing because they benefit from light and sun throughout the day. They also told us about the thermal comfort felt and the low loads in terms of energy. But above all, they are aware of the construction method and the media impact of this building due to the use of hemp concrete and told us of their great pride in living in this building. We did not expect this and were very happy about it because we place the human being at the heart of our concerns and we believe that the pride linked to the habitat is very important. At the end of the construction site, we placed frames in the hall with, for one, photos of the construction of the building at the time of the projection of the hemp and in the other a sample of hemp concrete as a memory of the constructive way. These executives are still there… Pedagogy seems important to us.

If you had to do it again?

This project, because it was innovative, was very time-consuming and I think that we did not devote enough time and energy to the design and layout of the garden which today, with regard to the quality of the building, appears a little poor in its processing. If we had to do it again, we would entrust a mission to a landscape designer so that the garden, aesthetically, environmentally and philosophically, would be consistent with the building.

Photo credit

Cécile SEPTET

Stakeholders

Contractor

Name: Immobilière 3F, Groupe Action Logement
Contact: Adrien BIGGI - 01 40 77 17 08 - adrien.biggi@groupe3f.fr
https://www.groupe3f.fr/

Construction Manager

Name: North By Northwest Architectes
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Stakeholders

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Function: Environmental consultancy
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Project economist

Type of market
Design and implementation

Allocation of works contracts
Separate batches

Energy

Energy consumption
Primary energy need: 41.72 kWh/ep/m².an
Calculation method: RT 2012

Envelope performance
More information:
$U_{wall} = 0.32 \text{ W/m}^2\text{.K}$ / $U_{roof} = 0.22 \text{ W/m}^2\text{.K}$ / $U_{w joinery} = 1.4 \text{ W/m}^2\text{.K}$ / $U_{low floor} = 0.19 \text{ W/m}^2\text{.K}$

Renewables & systems

Systems
- Heating system:
  - Condensing gas boiler
  - Individual gas boiler
- Hot water system:
  - Condensing gas boiler
  - Individual gas boiler
- Cooling system:
  - No cooling system
- Ventilation system:
  - Humidity sensitive Air Handling Unit (Hygro B)
- Renewable systems:
  - No renewable energy systems
- Other information on HVAC:
  Heat recovery from gray water for the production of domestic hot water.

Environment

Urban environment
Land plot area: 245.00 m²

Products

Product
Hemp concrete
Product category: Gros œuvre / Structure, maçonnerie, façade

Costs
Construction and exploitation costs

Total cost of the building : 1 693 265 €

Carbon

Carbon sink

The project is designed in hemp concrete sprayed on a Fermacell formwork base, plated on a secondary wooden frame, itself fixed to a primary concrete frame. A non-structural material, hemp concrete gives the project great thermal comfort and comfort in use. It allows a significant reduction in losses, the establishment of a clean site and the establishment of a positive carbon balance. Its lightness, its ease of implementation, its speed of execution presented here, with regard to the constraints of the site, an undeniable interest (fragility of the basement, very reduced dimensions of the plot, height of building).

The assembly of the primary structure with pre-walls, then pre-concrete slabs is quick and easy. The crane is only present during this phase. The wooden framework on the facade is prefabricated in Ille-de-France from a biosourced and light material. The bay panels are prefabricated and the carpentry complex is assembled in the factory. Hempcrete is a biosourced and innovative insulator. It is projected onto a Fermacell formwork base and then covered with a lime plaster.

GHG emissions

GHG in use : 7,80 KgCO₂/m²/án

Contest

Reasons for participating in the competition(s)

The project was a difficult equation to solve between a cramped plot (245m²), a restricted building footprint (122m²), and the possible height (G+8), necessarily involving an elevator for housing accessible to people with reduced mobility. The response provided by the constructor team consists of a landing serving two apartments per level (two T2 or a T1 and a T3). The kitchens are open to the living rooms in order to provide sunshine to all the rooms. On the last level, there is a T3 and a T5 duplex, through, enjoying a terrace with an unobstructed view of Boulogne and its woods. The interior comfort of the accommodation is qualified by hemp, its warm wall effect and its hygrothermal regularity.

The project is nestled between two buildings of 8 and 10 floors built in the 80s. The addition of a contemporary room between these two buildings was to allow their suture by the establishment of a sober and readable architectural style. The base of the building rises on 2 levels to ensure visual continuity. It is treated in solid brick in order to affirm its solidity and its link with the ground. The lime plaster on the facade interacts with the city’s limestone. The wooden frames and shutters affirm the domesticity of the threshold between the street and the interior privacy space.