Waste collection logistics base

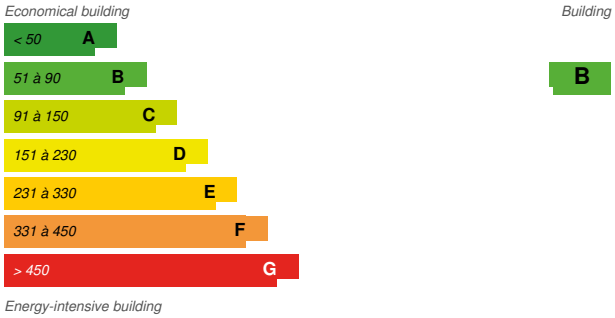
by Margaux PETILLON / 2019-05-21 11:31:09 / Frankreich / 6510 / FR

Primary energy need :

77.2 kWhep/m².an

(Calculation method : RT 2012)

ENERGY CONSUMPTION



Building Type : Other building
Construction Year : 2019
Delivery year : 2019
Address 1 - street : Les Taffeneaux, Le Château-d'Olonne 85180 LES SABLES D'OLONNE, France
Climate zone : [Cfb] Marine Mild Winter, warm summer, no dry season.

Net Floor Area : 1 000 m²
Construction/refurbishment cost : 1 700 000 €
Number of none : 7 none
Cost/m2 : 1700 €/m²

General information

The project was commissioned by the agglomeration of Sables d'Olonne for the organization of waste collection. One building houses the offices and social premises and the other the truck maintenance workshop, both are linked by a wooden frame awning. The **shape of the buildings is inspired by their bioclimatic orientation** , the office area opens towards the South and the West while the workshop side is turned towards the North to take advantage of an indirect light by avoiding overheating. **The set is designed with a wood structure and biobased insulation** .

The construction is **efficient and low carbon cost equivalent to "standard" constructions** . A locally available resource has been used: Hemp, of which Vendée is the second largest producing basin in France, and which is inseparable from the wood frame. The vertical walls are insulated with wood fiber and hemp concrete or vegetable wool and vegetable wool roofs. The orientation of the premises was designed to allow solar gain without causing overheating. The **roof was chosen in white tint** to minimize the effect of solar radiation.

An innovation reduces the project to 8 months only: prefabricated panels in wood frame, wood fiber and hemp concrete. The panels were assembled in the workshop during the structural work, allowing the hemp concrete to dry before being placed on the laminated wood structure. The insulation of the plant wool workshop also represents an advance in the construction of industrial buildings made of metal cladding, usually insulated with mineral wool. A double flow ventilation coupled with a powerful envelope allows to minimize the contributions in heating.

Sustainable development approach of the project owner

The project manager did not aim to build a biobased building but was seduced by the approach proposed by CAN. The agency was able to convince the

contracting authority for the use of biosourced materials. The cost of wood construction and the insurability of hemp were the two main points on which it was necessary to reassure the contracting authority. Awareness-raising work with companies was also put in place because they did not have knowledge of hemp use. The particularities of the construction incorporating hemp were explained to the carpentry company Carpenters of the Atlantic. All this happened very simply and all the actors played the game which allowed to realize the project without hindrance or additional delays. The project owner is very satisfied with the missions and services provided.

Architectural description

The two buildings, offices and workshop, have been separated to avoid any acoustic discomfort and are connected by a wooden frame canopy which turns in solar protection on the southern part of the offices. This awning, conceived as a link between the two entities, is punctuated by the design of staggered columns and the arrangement of V-shaped wooden beams. The shape of the buildings was inspired by their bioclimatic orientation, the office part opens towards the South and West to capture while the workshop side is turned to the North to take advantage of an indirect and diffuse light while avoiding overheating. The inverted slopes of the roofs allow the two buildings to respond and reduce visually the height difference between these templates necessarily different because of the exploitation. Both volumes are underlined by the contrasting shades of their facades. A particular reflection was conducted to design this set with a wood structure and biosourced insulation without constraining the architectural writing.

Biobased materials in the broad sense are for our agency indissociable wood in low carbon construction. The source of the materials is also important in order to reduce the carbon impact of the construction. A locally available resource was particularly used: Hemp, of which the Vendée is the second largest producing basin in France.

Both buildings have a wooden structure and are insulated with biobased materials. The walls of the office part were designed in prefabricated walls in wood frame, wood fiber and hemp concrete filling. Those in the workshop are insulated with hemp, linen and cotton wool, as well as the roofs of both buildings.

The orientation of the premises was designed to allow solar gain without causing overheating. The living rooms and offices are oriented South and West and protected by solar breezes adapted to the orientation while the technical and wet premises are buffer areas in the north. The roof was chosen in white tint to minimize the effect of solar radiation.

A constructive innovation allowed the project to be completed in just 8 months and to respect the constrained deadlines of the specifications. This innovation lies in the development of prefabricated panels in wood frame, wood fiber and hemp concrete. The panels were thus pre-assembled in the workshop during the structural work, allowing the hemp concrete to dry.

The insulation of the plant wool workshop also represents an advance in the construction of industrial buildings made of metal cladding, usually insulated with mineral wool. All the walls of two entities are supported by glued laminated timber frames. A double flow ventilation coupled with a powerful envelope allowed to minimize the contributions in heating.

Building users opinion

Very good return of users of the site, the building is functional, practical, clean, working conditions are optimal.
The project owner is very happy with the building: "This project makes the elected officials want to produce other constructions with biosourced materials"

If you had to do it again?

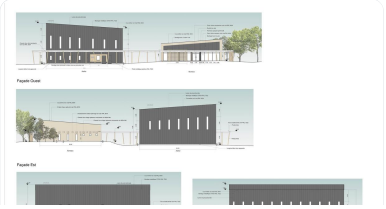
The main difficulties with biosourced materials are psychological, because most people associate bio-sourced materials with uninsurable and high-cost self-construction projects. It is therefore necessary to convince by demonstrating insurability and financial feasibility. For some uses, the regulation vis-à-vis biosourced materials still has some gaps. The dialogue with the contracting authority and the control offices helped to remove concerns.

See more details about this project

http://can-ia.fr/base-logistique-bom/
https://www.construction21.org/france/articles/fr/green-solutions-base-logistique-pour-l-organisation-et-la-collecte-des-dechets-des-sables-d-olonne.html

Photo credit

CAN-ia


Stakehol

Contractor

Name : Les Sables d'Olonne Agglomération
Contact : jean-françois.robin@lsoagglo.fr
http://www.lsoagglo.fr/

Construction Manager

Name : CAN - ia
Contact : contact@can-ia.fr
http://can-ia.fr/

Stakeholders

Function : Structures calculist

3C ECO STRUCTURES

contact@3c-eco-structures.com

http://www.3c-eco-structures.com/
BE structure

Function : Thermal consultancy agency

AIREO ENERGIES

contact@aireo-energies.fr

BE fluids

Function : Company

SOFULTRAP

Earthmoving / HHT

Function : Company

VOISIN CONSTRUCTIONS

Big work

Function : Company

Les Charpentiers de l'Atlantique

Wood frame

Function : Company

Cruard Couverture

Roofing / Siding

Function : Company

ISOLAVIE

Exterior lime plaster

Function : Company

CSM 79

Locksmith

Function : Company

Serrurerie Luconnaise

Exterior joinery / curtain wall

Function : Company

SARL Lilian

Partitions / dubbing / false ceilings

Function : Company

SARL Terrien

Interior joinery

Function : Company

SARL CCV

Floor coverings and hard walls

Function : Company

SARL Aucher

Painting

Function : Company

CAJEV

Green areas / fences

Function : Company

SNCV Ouest

Heating / ventilation / plumbing

Function : Company

SNGE Ouest

electricity

Contracting method

Separate batches

Type of market

Table 'c21_germany.rex_market_type' doesn't exist

Energy

Energy consumption

Primary energy need : 77,20 kWhep/m^2.an

Calculation method : RT 2012

Breakdown for energy consumption : Heating: 38.5 kWh ep / m² ECS: 5.4 kWh ep / m² Lighting: 11.8 kWh ep / m² Auxiliaries VMC: 19.3 kWh ep / m² Auxiliaries of distribution: 2.2 kWh ep / m²

Envelope performance

More information :

The envelope is made of a wooden frame wall with hemp concrete filling, which allows a better inertia. The outer walls are composed as follows: 20mm lime plaster, 120mm wood fiber plasterboard and plasterboard, 200mm hemp concrete, 40mm gypsum fiberboard

The daily inertia class of the building is: Amq surf (m²) = 4, Cmq surf (kJ / K.m²) = 190

Rt exterior wall: 5.48 m².K / W
Rt low floors: 4 m².K / W
Rt high floors: 6.1 m².K / W

Building Compactness Coefficient : 0,76

Renewables & systems

Systems

Heating system :

- Heat pump

Hot water system :

- Individual electric boiler

Cooling system :

- No cooling system

Ventilation system :

- Double flow heat exchanger

Renewable systems :

- No renewable energy systems

CAN proposed the installation of photovoltaic panels, which could be put in place in the future. A technical room is already reserved.

Solutions enhancing nature free gains :

La conception bioclimatique des bâtiment permet d'améliorer les gains passifs en énergie. Les bâtiments sont orientés afin de permettre des apports solaires sans engendrer de surchauffe. La partie bureau s'ouvre vers le Sud et l'Ouest, tandis que le côté

Smart Building

BMS :

The lighting is in automatic mode by presence detection and absence in most spaces. The switching on and off are done automatically according to threshold.

Environment

Urban environment

Land plot area : 15 482,00 m^2

Built-up area : 15,48 %

Green space : 2 784,00

The building is located in a rural area, next to the TMB factory Taffeneaux. It is located near a classified wood and close to the road. It is part of the industrial writing while showing discretion and integration in the natural environment. Neutral and mineral colors allow a better integration in the site. The building was built following the field's topography, which limits the excavation of the earth. Regarding earthen excavated, it was used enremblais.

Products

Product

Chenevotte Chanvribat® (Hemp concrete)

TRADICAL®

contact@bcb-tradical.com

http://www.bcb-tradical.com/

Product category : Table 'c21_germany.innov_category' doesn't exist SELECT one.innov_category AS current,two.innov_category AS parentFROM innov_category AS oneINNER JOIN innov_category AS two ON one.parent_id = two.idWHERE one.state=1AND one.id = '9'

Among the bio-based materials, hemp needs to be better known. This plant growing without plant protection product and without irrigation is very useful for crop rotation. It is then fully recoverable: its highly nutritious seeds are processed for food and cosmetics Its fiber is used for textiles, paper or bio-plastic The chènevotte, located in the heart of the stem, serves as mulch for horticulture and granulate for

Hemp concrete is a mixture of hemp, a mineral binder and a mixing water. This nonstructural material is a very good hygro-thermal regulator, which brings both insulation and inertia to the building, it works

as a monomasse. Cost of hemp concrete per m² / ep 200mm (excluding wood frame): 108,00 € / m² Its perspirancy quality or high permeability to water vapor makes it an excellent hygienic regulator. It is also a so-called "phase change" material giving off latent heats of change of state. In other words, this feature ensures optimal summer and winter comfort, without the need for electrical systems. The wall alone manages the phase shifts of temperature and humidity that the structure can experience throughout a year. These qualities make it a high-performance material which, far above the thresholds, meets the thermal regulations in force. In addition to its hygrothermal qualities, hemp concrete is a carbon sink for the structure, storing more CO2 than its life cycle emits. It also does not emit volatile organic compounds and thus ensures healthy atmosphere for the user by regulating the surface moisture on the surface of the interior walls. Hemp concrete avoids the risk of condensation that can be observed in conventional housing when mechanical ventilation malfunctions for example.

The product is under technical notice and holds its professional rules. The workers made the prefabrication of wood-concrete hemp panels in the workshop. They were able to appreciate the comfort of the workshop work and the speed of implementation on site. Hemp concrete provides significant thermal and hygroscopic comfort for its occupants.

Tradical® Thermo Lime (Hemp Concrete)

TRADICAL®

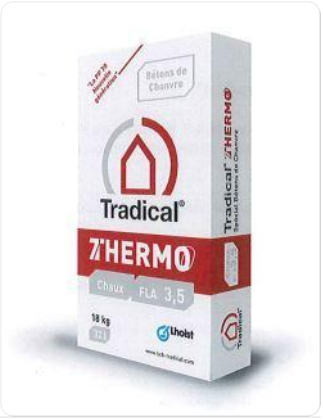
contact@bcb-tradical.com

http://www.bcb-tradical.com/

Product category : Table 'c21_germany.innov_category' doesn't exist SELECT one.innov_category AS current,two.innov_category AS parentFROM innov_category AS oneINNER JOIN innov_category AS two ON one.parent_id = two.idWHERE one.state=1AND one.id = '9'

Material designed from Gypsum, significantly less energy intensive than cement for its production. Technical information is available here: http://www.bcb-tradical.com/wpcontent/uploads/2018/02/Brochure-Beton-Chanvre-Tradical-12-2017.pdf Cost of hemp concrete per m² / ep 200mm (excluding wood frame): 108,00 € / m²

The material meets the NF DTU 26.1 requirements. The workers appreciated the prefabrication of wood-concrete hemp panels in the workshop. Because of the comfort and the speed of setting up on site. The concrete brings a thermal and hygroscopic comfort very appreciated by the occupants.



Rigid Steico integral wood wool panels (incorporated on prefabricated wood / hemp concrete panels)

Steico

j.legouas@steico.com

https://www.steico.com/fr/

Product category : Table 'c21_germany.innov_category' doesn't exist SELECT one.innov_category AS current,two.innov_category AS parentFROM innov_category AS oneINNER JOIN innov_category AS two ON one.parent_id = two.idWHERE one.state=1AND one.id = '9'

Wood wool is a biobased material derived from sawmill waste. This insulation has been exploited as ITE and support coatings (walls). Soprema® offers similar panels that benefit from technical advice, for applications on masonry and timber framing.

This material applied as ITE provides additional insulation and eliminates almost all thermal bridges of the building. Its implementation in shop or on site remains simple and fast.

Biofib Trio®

CAVAC

02 51 36 51 51

https://www.coop-cavac.fr/

Product category : Table 'c21_germany.innov_category' doesn't exist SELECT one.innov_category AS current,two.innov_category AS parentFROM innov_category AS oneINNER JOIN innov_category AS two ON one.parent_id = two.idWHERE one.state=1AND one.id = '9'

This material is composed of 92% of vegetable fibers (flax, hemp and cotton) and 8% of binder. Link: https://www.biofib.com/files/en/BIOFIB-Trio.pdf

This material and under technical notice: https://www.biofib.com/files/BIOFIB_TRIOAvis_technique_CSTB_Murs.pdfIt does not trigger irritation to the skin. If inhaled, the body is able to
easily destroy this type of plant fiber. In fact, it is appreciated by the workers who implement it. He brings also a remarkable thermal and acoustic comfort within the building, thus guaranteeing a working space pleasant. Companions no longer wish to lay mineral wool.

Costs

Construction and exploitation costs

Cost of studies : 110 500 €

Total cost of the building : 1 797 690 €

Health and comfort

Water management

Rainwater is recovered for the truck wash station. The flow of water is planned gravitarily on the ground. The consumption of rainwater recovered depends on the washing needs.

Indoor Air quality

The use of hemp concrete for walls induces an absence of organo-volatile compounds, and contributes to the sanitary quality of the buildings by passively regulating the humidity in the premises. It reduces the problems of condensation and mold on the walls, common in the conventional frame. Hemp concrete does not emit VOCs: manufacturers who sell products certify that their hemp concretes have A + sanitary labeling.

Comfort

Health & comfort :

The premises dedicated to the users make it possible to ensure a certain comfort. The locker rooms benefit from natural light. The relaxation room is south facing and a terrace with pergola ensures summer comfort. Between the office building and the workshop, a corridor allows to circulate in spite of the bad weather, and, directed west, protects from the summer sun. The materials used for the construction are healthy and the hemp ensures a hygrometric regulation in favor of the comfort atmosphere, summer and winter. The surface temperature of the walls is balanced, making it possible to avoid cold wall phenomena. Hemp concrete acts as a natural air conditioner all year round thanks to the latent heaters of state changes that clash interior temperatures. The workshop was insulated with hemp-cotton-linen wool, although this was not requested by the contracting authority. This improves the quality of life of employees in the workshop. This helps to regulate the temperature, in summer and winter.

Acoustic comfort :

Hemp concrete has an acoustic absorption coefficient of 0.8.

Daylight factor : Bureaux : 83-93% - Circulation : 46% - Vestiaires : 44%

Carbon

GHG emissions

GHG in use : 3,00 $KgCO_2/m^2/an$

Life Cycle Analysis

Eco-design material :

Hemp concrete is one of the first building materials to have a life cycle analysis. What's more, favorable to the environment: 48 kg of CO2 / m² stored (ACVINRA 2005 on TRADICAL 70 with hemp wood and wood)

Contest

Reasons for participating in the competition(s)

The logistics base for waste organization and collection consists of two workspaces: a workshop and offices. **The use of healthy and bio-based materials, such as wood and hemp, benefits the health of users** . The wood structure apparent in the workshop makes the space warm. Comfort at work is enhanced with **indoor and outdoor relaxation areas** .

Building candidate in the category

Green Solutions AWARDS
powered by Construction21.org

Santé & Confort

Prix du public

Prix des Etudiants

Date Export : 20230531205717