



## College "Notre-Dame de Bon secours"

by SOPHIE SANCHEZ / 2018-05-24 17:34:01 / Belgique / 12983 / FR

New Construction



Primary energy need :

# 74 kWh/m<sup>2</sup>.an

(Calculation method : Other )

### ENERGY CONSUMPTION

*Economical building* *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 Type** : School, college, university

**Construction Year** : 2017

**Delivery year** : 2018

**Address 1 - street** : 7130 BINCHE, Belgique

**Climate zone** : [Cfb] Marine Mild Winter, warm summer, no dry season.

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**Net Floor Area** : 1 000 m<sup>2</sup>

**Construction/refurbishment cost** : 1 288 026 €

**Number of Pupil** : 13 Pupil

**Cost/m2** : 1288.03 €/m<sup>2</sup>

## General information

Since the start of All Saints' Day 2017, students in Secondary 5 and 6 of the College "Notre-Dame de bon secours" in Binche are the first in Belgium to take classes in a building isolated with straw and wooden frame. A spacious, bright, and healthy pavilion has replaced a prefabricated sheet metal energy wastage. This pavilion is the first prefabricated school building made of wood, compressed straw and clay plaster in French-speaking Belgium.

In 2014, the management of college "Notre-Dame de Bon secours " in Binche, in the Walloon Region, wanted to set an example in order to be in full coherence with the applied pedagogy of the establishment defending respect for the environment and of eco-citizenship.

Also after much research and after being surrounded by "specialists", she made the choice of a passive construction with materials mainly of plant origin. Thus, the construction system of the college which was built by De Graeve, a subsidiary of Eiffage Construction Benelux and specialist in passive constructions, combines three renewable materials: wood for structural work, straw for walls, earth. In addition, the roof is cork insulated, as the clay coating for the interior lining.

This college uses each subject in a reasoned way to make the most of it and avoids wasting all the gray energies. Building with natural materials made it possible to build buildings with a negative carbon footprint. Being of vegetable origin, the wood and the straw are fixers of CO<sub>2</sub>. The choice of materials has been designed to promote a supply via sectors as short as possible.

This construction is designed to last, the care taken in its implementation offers a long life to the building; in addition, if we decide to dismantle them one day, the materials will be almost completely compostable. The interior comfort is also optimized thanks to the absence of volatile substances (VOC) and thanks to the hygrometric regulation properties of the earth coatings. The straw bale walls offer sound insulation qualities.

## Building users opinion

Building with natural materials makes it possible to build buildings with a negative carbon footprint. This construction is designed to last, the care taken in its implementation offers a

long life to the building but if we decide one day to dismantle them, they are almost completely compostable

This type of construction removes CO2 from the atmosphere since it allows to store a significant amount as long as the construction is standing.

For comparison, building conventionally generates additional CO 2 in the atmosphere, because of the nature of the materials used often from petrochemicals and the energy it took to industrially manufacture them.

Moreover, no indoor pollution of the ambient air.

Use of solid wood, untreated. Floors and partitions are counter-nailed (rather than bonded) and all insulators used are completely sanitary neutral.

In addition, straw bale walls also have acoustic insulation qualities.

The site was treated with a result in "blowerdoortest" better than the threshold set for a passive construction.

## If you had to do it again?

This project was not an easy task:

1. the legend of the 3 little pigs and the prejudices related to it are still very much present in the collective unconscious; straw construction is still too much considered today as an alternative or even marginal vision of the possibilities of building (but we informed and convinced);
2. Finding the architect with a big A was not easy (but we got there);
3. Straw building is still a pioneering step that has not given us the comfort of relying on the experience of other establishments;
4. The heaviness and slowness of all administrative procedures: we encourage us to engage in passive or positive constructions but no administrative or financial support is offered.

## See more details about this project

<https://www.cndbs-binche.be/drupal/constructionPavillon>

<http://www.pailletech.be/binche/>

<http://degraeve.be/project/college-notre-dame-du-bon-secours/>

## Data reliability

Self-declared

## Stakeholders

## Contractor

Name : Collège Notre-Dame de Bon Secours ASBL

Contact : Mme Maggiordomo Directrice - maggiordomo@skynet.be

<https://www.cndbs-binche.be/>

## Construction Manager

Name : DE GRAEVE SA

Contact : Olivier Mareschal Administrateur délégué (olivier.mareschal@degraeve.eiffage.be) -

Marc Vermaere – Conducteur chantier (marc.vermaere@degraeve.eiffage.be)

<http://eiffagebenelux.com/fr/societe/de-graeve>

## Stakeholders

Function : Designer

AAIA - Atelier Alter Ingénieurs et Architectes

Christophe Lootvoet - cloodvoet@aaia.be

<http://www.aaia.be/>

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Function : Environmental consultancy

EURECA et A+ Concept

Matthieu Bourgeois - mb@eureca-net.be

<http://eureca-net.be/>

Economy and rational use of energy, advice and support

## Contracting method

General Contractor

<https://www.construction21.org/belgique/data/sources/users/1917/gdg-ca-eblx-29-mars-20181.pptx>

## Owner approach of sustainability

**For several years, the College "Notre-Dame of Bon Secours" of Binche is invested in the sustainable development, with an "Eco-Team" which carries out several projects to make the students aware of the environment and the eco-citizenship. In order to be in full coherence**

**with the pedagogy applied in the establishment, the direction of the college wanted**

- to set an example for future adults by choosing a positive construction with materials predominantly of plant origin;
- provide students and teachers with a healthy work environment.

**Also in 2014, after a long reflection and many research, and after being surrounded by**

"specialists", the management has launched a passive building project built with materials mainly of plant origin, which is a first in Belgium. The construction system combines three renewable materials with timber, straw for insulation, earth with cork on the roof and clay plaster for interior cladding.

"We wanted to make the values of our Eco-Team a strong gesture," says Teresa Maggiordomo, director of the school. The board quickly approved the project, the expense being not much higher than a more traditional solution. "We are at 1250 € / m<sup>2</sup> gross, which remains competitive," says Jean-Michel de Marchi, deputy director. The first building has eight classes, the second building five classrooms, a laboratory and sanitary facilities. **However, the client had to show determination because he had to overcome many obstacles:**

- the legend of the three little pigs and the prejudices related to it are still very much present in the collective unconscious; straw construction is still too much considered today as an alternative or even marginal vision of the possibilities of building;
- to find the architect with a large A was not easy;
- building a straw is still a pioneering process that does not allow to rely on the experience of other institutions;
- the cumbersome and sluggishness of all the administrative procedures has slowed the realization: "we encourage us to engage in passive or positive constructions but no administrative or financial support is offered", Teresa Maggiordomo laments

## Architectural description

Since start of All Saints' Day 2017, 5th and 6th grade students at the "Notre-Dame de Bon Secours" secondary school in Binche are the first in Belgium to take classes in a building isolated from straw and timber framing. A spacious, bright, and healthy pavilion has replaced a prefabricated sheet metal energy wastage. This pavilion is the first prefabricated school building made of wood, compressed straw and clay plaster in French-speaking Belgium.

This construction technique offers many advantages. **The structural work consists exclusively of wood, straw and earth, which is renewable materials. The other materials are as natural as possible: the new pavilion has no concrete slab for example, but a cork insulation and a dry screed.**

" We value environmentally friendly, unprocessed and healthy materials, thus ensuring recyclability of the building ", explains Christophe Lootvoet, architect of the project. While construction waste is being upgraded at a high cost, the pavilion can be almost completely compostable if it ever needs to be dismantled.

**Second advantage: the exemplary carbon footprint.** " To build a conventional passive building, a CO<sub>2</sub> peak is produced before and during construction " due in particular to the use of petrochemical materials. " We are storing CO<sub>2</sub>, which is much more interesting, " continues Christophe Lootvoet. **Because being of vegetable origin, the wood and the straw are fixers of CO<sub>2</sub> and make it possible to reach a negative carbon balance.**

**Third advantage of natural materials: indoor pollution is avoided.** " Endocrine disruptors are present in a lot of materials. Even if they meet the standards, when you accumulate

*phthalates that release vinyls, paintings on the walls and ceiling, you do not live in a healthy environment . "*

Another advantage: humidity is regulated by the clay coating on the walls. " *With walls covered with plaster and latex paint, the humidity of the air varies greatly with condensation problems in the key. Here, we are dealing with a large exchange surface material, full of micropores, which allows a very constant humidity level. "*

The project began in June 2017. The panels were transported from the workshops of the Paille-Tech cooperative to Franière (Florefe), and assembled in Binche. " *We used techniques from self-construction, with all the alternative aspect that implies, "* says Antoine Bonnert, manager of Paille-Tech.

## Energy

### Energy consumption

Primary energy need : 74,00 kWh<sub>ep</sub>/m<sup>2</sup>.an

Primary energy need for standard building : 125,00 kWh<sub>ep</sub>/m<sup>2</sup>.an

Calculation method : Other

Final Energy : 125,00 kWh<sub>ef</sub>/m<sup>2</sup>.an

Breakdown for energy consumption :

Heating are 37 kWh / m<sup>2</sup>.an

More information :

Net energy requirements heating are 37 kWh / m<sup>2</sup>.year instead of 70 to 80 kWh / m<sup>2</sup>.year as standard. (compared to the low energy which is 30 kWh / m<sup>2</sup>.an or the passive which is 15 kWh / m<sup>2</sup>.an).

51 403 kWh<sub>ep</sub> / year are saved between the building situation and the reference value, ie 81.28 kWh<sub>ep</sub> / m<sup>2</sup>.year of savings compared to the reference value.

### Real final energy consumption

Year of the real energy consumption : 2 019

### Envelope performance

Envelope U-Value : 0,12 W.m<sup>-2</sup>.K<sup>-1</sup>

More information :

High performance insulation

U = 0.12 W / m<sup>2</sup> ° K (passive)

It is a passive building.

Building Compactness Coefficient : 0,40

Indicator : EN 13829 - n50 » (en 1/h-1)

Air Tightness Value : 0,51

Users' control system opinion :

Not applicable.

## Renewables & systems

### Systems

Heating system :

- Condensing gas boiler

Hot water system :

- Gas boiler

Cooling system :

- No cooling system

Ventilation system :

- Double flow heat exchanger

Renewable systems :

- No renewable energy systems

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Other information on HVAC :

Nothing in particular

Solutions enhancing nature free gains :

Nothing in particular

### Smart Building

BMS :

Not applicable

Users' opinion on the Smart Building functions :

Not applicable

## Environment

### Urban environment

The city of Binche has +/- 33,575 inhabitants. Former mining and textile town, Binche is world famous for its architectural heritage and its Carnival. The school and its surroundings (lawn, playground) are located in the city center. The city is well served by public transport (Train, bus ...).

Land plot area : 5 000,00 m<sup>2</sup>

Built-up area : 20,00 %

Green space : 4 000,00

## Products

### Product

Insulation of straw and clay walls

Pailletech

Paille-Tech scrl Rue de la Glacerie, 6 B-5150 Franière Belgique Tél : +32.(0)81.44.07.39 TVA : BE 0820.755.996

<http://www.pailletech.be/>

Product category : Table

'c21\_spain.innov\_category' doesn't exist

SELECT one.innov\_category AS

current,two.innov\_category AS

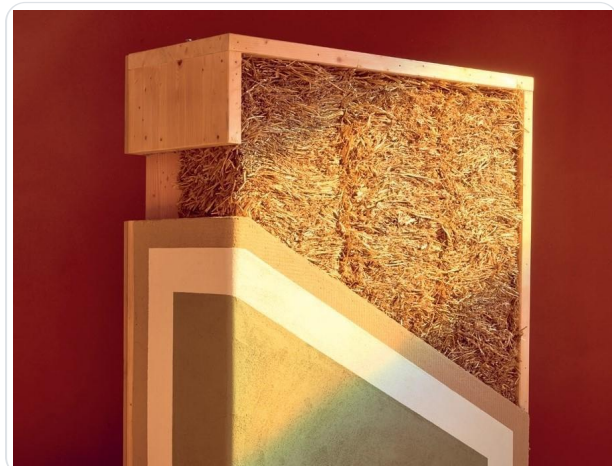
parentFROM innov\_category AS

oneINNER JOIN innov\_category AS two ON one.parent\_id = two.idWHERE one.state=1AND

one.id = '8'

Constructive system that uses straw as insulation and clay plaster for interior lining.

Straw construction is still too much considered today as an alternative or even marginal vision of the possibilities of building, but the contracting authority managed to convince.



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Expanded cork



Qualicork

info@qualycork.be

<http://www.qualycork.be>

Product category : Table

'c21\_spain.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'

Use for the floor and roof of cork and rubber.

No specific problem. High performance insulation:  $U = 0.13 \text{ W / m}^2\text{K}$



## Costs

### Construction and exploitation costs

Total cost of the building : 1 288 026 €

## Health and comfort

### Comfort

Health & comfort :

Ultra perform insulation :  $U=0,13 \text{ W/m}^2\text{K}$

Calculated indoor CO2 concentration :

pas d'information

Measured indoor CO2 concentration :

pas d'information

Calculated thermal comfort : pas d'information

Measured thermal comfort : pas d'information

Acoustic comfort :

No values measured to date.

### GHG emissions

GHG in use : 22,75 KgCO<sub>2</sub>/m<sup>2</sup>/an

Methodology used :

Calculation method according to Appendix D of the AGW May 8, 2014

Building lifetime : 100,00 an(s)

Appendix D of AGW, May 8, 2014

## Contest

### Reasons for participating in the competition(s)

The college "Notre-Dame de Bon secours" of Binche is a positive construction using each subject in a rational way to get the best and avoids wasting all gray energy. Building with natural materials made it possible to build buildings with a negative carbon balance. Being of vegetable origin, the wood and the straw are fixers of CO<sub>2</sub>.

In a socially responsible approach, the De Graeve company that built the building, created in 1965 and established in Beez since 1985, has developed since 2008 an expertise in the construction of passive buildings in wood frame or in "massive-passive" .

These highly technical projects mobilize both the know-how and the creativity of the teams. New technologies, new materials, very particular care to bring during the execution are as many subjects of reflection on which De Graeve works with its partners.

**Several projects are to his credit** : the first passive nursery school in the French Community, 50 passive student housing units for UCL, a passive wooden frame nursery in La Louvière and the Ottignies municipal office in Louvain-la-Neuve. (1500 m<sup>2</sup> of passive offices). A set of 14 passive social apartments built on four floors in wood frame, exceptional project, has been awarded many times, including the "Blue House" 2012 Foundation for Generations Futures (price for sustainable construction and affordable). **De Graeve is a member of the "passive houses platform" and the CAP2020 cluster.**

### Building candidate in the category





Energie & Climats Tempérés



Bas Carbone



Santé & Confort



Coup de Cœur des Internautes

Date Export : 20230520100214