

Sports infrastructure for Vanves high school

by [Yasmina Sandoz](#) / 2022-11-14 00:00:00 / France / 816 / FR



Year of commitment : 2022

Circular economy and waste management : Eco-Design, Bio-based materials

Biodiversity & Ecosystems : / Urban ecosystem /



7 800 000 €

Builder

Lifteam

Manager / Dealer

Ile-de-France Region / Ile-de-France Sustainable
Construction (MOD)

GENERAL INFORMATION

A hall, a changing room, a shelter, plus work on the slopes, at a cost of 7.8 million euros.

“Funded by the Ile-de-France Region, the City and the Department, the renovation of the sports facilities of the Cité scolaire Michelet will benefit the 2,300 students of the

school complex (middle and high school students) but also the Vanvéens who will be able to access it, as once the work is completed.

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A village near Paris, Vanves. Its lord. Its splendid castle, which has become a high school and even a school complex, surrounded by the park which serves as a sports ground. All in the middle of Vanves, a green lung that makes you forget the highways. Until now, the park and basic sports facilities were reserved for schools. The Mayor of Vanves supports an evolution towards the pooling of sports surfaces. To do this, it is a question of building a pavilion serving as a changing room and two basketball courts protected by a hall.



In 2016, the Exploration architecture agency (Benoît Le Thierry d'Ennequin), very involved in particular in sports equipment, designed the project with EVP as the design office more specifically responsible for the structure without the ETFE membrane that covers the hall. The ETFE membrane is nothing new, it dates back to the 1940s, it is found almost everywhere in single or double skin. In Munich, Frey Otto's stadium uses glass as if it were ETFE. A sustainable approach like the one wanted by IDF Construction Durable calls for the use of single-skin ETFE. This thin and light solution allows the use of a wooden structure underneath.

The cloakroom is like a pagoda: on a solid mineral base, the raised roof describes a cantilever of 5 meters all around. There is a sort of dialogue game between the hall and the pavilion, in particular through the use of wood and ribs.



Wood, that would mean braces, cables in the cross of Saint Andrew. The design team prefers to use steel posts firmly riveted in the basement, some of which also act as water drainage. Here we touch on the big problem of this hall: the PLU prohibits exceeding 10 meters, but sports standards require 7 meters free; it is not only necessary to accommodate the load-bearing structure in BLC beams, and to add space so that the membrane does not touch it. It is above all necessary to create waves to channel rainwater or even snow towards the gutters and posts.



This hall in Vanves will be subject to an ATEX carried out by Taiyo Europe, subcontractor in charge of the ETFE coverage of the contractor Lifteam. We therefore obtain a conjunction of three engineering companies, EVP, then BE Concept Bois Technologie (CBT based in St Sulpice in Switzerland) of the CBS-Lifteam group, and finally Taiyo Europe based in Munich which will manufacture and install the membrane. As is common, the design office provides the executive with an in-depth study which is taken over from start to finish by the company, in consultation with Taiyo.

The BE CBT offers two types of reinforcements. On the one hand, for the pavilion, it is necessary to reinforce the overhangs at the corners and to do this, place solid but invisible sandpits on top, in the middle of the insulation. Same concern for stability of the corners of the hall, which will be reinforced by the use of steel. The modification is ultimately minimal since the peripheral frame for the membrane and the posts are made of steel.



The ribbed structure of the hall, which will act as a sunscreen, has an orthogonal regularity that does not respond exactly to the stresses. Mr. Berriaud, EVP: "As soon as the fiber of the wood is interrupted, its structural capacity is diminished". We see a checkerboard but hides a real primary load-bearing structure and then a secondary structure of less structural interest. In order to follow the curvatures of the roof, the BLC beams manufactured by Cosylva for ECOTIM, manufacturing site of the CBS-Lifteam group, in spruce, are not fully curved to the desired geometry because the radius of curvature is not adequate. The panels are recut thanks to the Cosylva portal.



The BE CBT proposes to change the thicknesses of the ribs, in particular to lighten, by reducing the thickness to 10 cm. The architect Le Thierry d'Ennequin asks for a progressive layout in order to mask the differences in height and thickness between the ribs, in particular by passing from the periphery to the interior. For the eye, we have a simple more or less regular grid.



All this is controlled by the greatest difficulty of the site. The membrane exerts a strong pressure on the structure. Even at the Allianz Riviera, the wood and steel frame does not retain the membrane, which is carried by metal cables. According to Taiyo Europe, this is undoubtedly one of the first times that the membrane has been placed on such a flexible structure. And that justifies ATEX. As well as many exchanges. When the Taiyo Europe team arrives in Vanves, the clashes are sometimes 10 cm apart when they should be aligned. Yes, they are staggered before deformation, but perfectly aligned under load, exactly as designed by the BE CBT.



Upstream, Ivan Bloch at CBT made long calculations. This does not bother him, specialist that he is in geodesic structures. He had to anticipate the deformations and transmit the correct manufacturing data. Downstream, once the structure was laid in the summer of 2021, temporary cables compressed it and the meticulous and slow laying of the membrane gradually relieved the action of these cables. It is better to leave the installation of the membrane to specialists.

The site is completed without too many supply problems in 2021, it has moved on to the latest small sports equipment. The inhabitants of Vanves who pass in the street notice the two wooden structures, which will soon welcome them.



Progress Status

Delivered

Data Reliability

Self-declared

Funding Type

Public

Sustainable Development

Well Being :

Explorations Architecture has designed 3 elements integrated into the green park:

1. The open hall, free and complex structure that covers the stadium
2. Japanese-style locker rooms
3. The chameleon effect technical room

Social Cohesion :

Before these works, the former sports area was reserved for high school students. This new infrastructure is now open to the general public, allowing different audiences to meet.

Preservation / Environmental Improvement :

Wooden structure, ultra-thin ETFE membrane for less material, more transparency and visual comfort.

The project integrates maintenance and upkeep.

Testimony / Feedback

- [Article from HolzZentralblatt \(in German\)](#)
- [Monitor article](#)
- [Article from the IDF Region](#)
- [Article by Fordaq](#)

Governance

Ile-de-France region

Holder Type : Local Authority

Lifteam

Builder Type : Construction Industry

Ile-de-France Region / Ile-de-France Sustainable Construction (MOD)

Manager / Dealer Type : Public

Speakers:

- **Client :** Ile-de-France Region (Saint-Ouen, 93)
- **Delegated contracting authority :** IDF Construction Durable (Pantin, 93)
- **Architect :** Explorations Architecture (Paris)
- **BET structure :** EVP (Paris)
- **BET wood structure :** CBS (Choisy-le-Roi, 94)
- **Carpenter :** Lifteam (IDF subsidiary Choisy-le-Roi, 94)
- **Supply :** Ecotim (La Rochette, 73)

Sustainable Solutions

Low carbon optimization of structures

Description :

For the low-carbon optimization of structures, our philosophy is to reduce dead weight loads, by lightening these structures using available wood materials, which is always in line with our line: "more engineering, less material".

Less material means less self-weight to descend into load-bearing walls on foundations which will also be reduced.

This is how we question the cover to optimize the charges.

In the case of the Vanves sports hall project, the ETFE membrane weighs 3 kg/m². By way of comparison, 30 cm of open ground on a green roof weighs 500 kg/m².

- Management of natural areas
- Low-carbon materials/ infrastructure

Company (es) Website :

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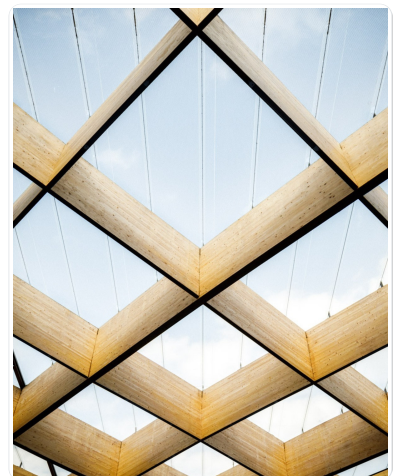


Photo credit

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Contest

Reasons for participating in the competition(s)

- Une ingénierie du bois technique, durable et esthétique.
- Un travail de coopération entre divers acteurs pour mettre au point la solution la plus adaptée aux besoins des visiteurs du site et au cadre naturel.
- Un lieu public ouvert, facteur de cohésion sociale dans la ville.
- Une infrastructure marquée de l'empreinte naturelle du lieu.

Building candidate in the category



Prix du public





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