


Maison des Yvelines - Nubian Vault

by Chloé Adloff / 2017-06-13 17:47:11 / International / 18199 / EN

New Construction



Primary energy need :

0 kWhpe/m².year

(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 : Other building
Construction Year : 2016
Delivery year : 2016
Address 1 - street : OUROSSOGUI, Other countries
Climate zone : [BSh] Subtropical Dry Semi-arid (Steppe)

Net Floor Area : 370 m²
Construction/refurbishment cost : 107 000 €
Number of none : 3 none
Cost/m² : 289.19 €/m²

Proposed by :



General information

This amazing Nubian Vault® building, inaugurated on Dec 4th 2016, is one of AVN's major recent achievements in Senegal. Financed in part by the French Conseil Départemental des Yvelines, in collaboration with the NGO Le Partenariat and the Regional Development Agency of Matam, the local Commune, and the Regional Urbanism Service, it is an exemplary project. The building is due to house volunteers working with and for the local community, and provide them with office space and meeting facilities.

The construction, with technical guidance from AVN, was carried out by the firm Habitat Moderne, run by the Burkinabe NV entrepreneur Richard Somda. It is an early and excellent example of the recognition now awarded to the Nubian Vault concept by the formal sector, and also serves as a model demonstration building for the region.

*The Nubian Vault is a novel reinterpretation of an ancestral technique, revived by AVN in order to allow access to appropriate and affordable housing to as many people as possible, as soon as possible. AVN bases its action on key technical innovations, adapted to the Sahelian climate, resources and social and economical context.

The Nubian Vault (NV) technique is an age-old method of timber-less vault construction, originating in Upper Egypt. It uses only earth bricks and earth mortar. Nubian Vaults built over 3,500 years ago at the Ramesseum Mortuary Temple in Luxor are still standing.

During the last fifteen years, AVN has successfully introduced a simplified, standardised version of this ancient technique in Burkina Faso, Mali, Senegal, Benin and Ghana. This standardised NV technique is:

- ecologically sustainable: no corrugated iron roofing sheets, nor timber beams, rafters, or supports;
- carbon neutral - none of the construction materials are manufactured, or transported long distances, nor do any trees need to be cut down;
- economically viable: only locally available raw materials (earth, rocks, and water) are used, favouring local economic circuits and self-sufficiency;
- comfortable: due to the excellent thermal and acoustic insulation properties of earth construction;
- durable: NV buildings have a far longer lifetime than those with corrugated iron and timber roofs, and maintenance is simple;
- modular: applicable to a wide range of buildings (houses, schools, healthcentres...), of different styles (flat terrace roofs, two-storey buildings, courtyard buildings...), which are easily extendable;
- vernacular: incorporating traditional practices and aesthetics of earth architecture.

AVN's simplified and standardised version of the technique has been adapted to the climatic conditions and traditional know-how of the Sahel region, making it easy to learn on-the-job:

- roofs are exclusively vaulted (no domes), and can incorporate a traditional flat roof-terrace ;
- vaults are a standard width (3,25 metres), made from mud bricks of a standard size ;
- a guide cable is used to define the curvature of the vault ;
- walls are a standard thickness, and openings for doors and windows a standard size ;
- plastic sheeting is incorporated in the roof to reduce water penetration and erosion.

See more details about this project

<https://www.construction21.org/articles/h/low-carbon-winner-of-the-green-solutions-awards-2017-maison-des-yvelines-senegal.html>

<http://www.lavoutenubienne.org/en/maison-des-yvelines-ourossogui-north-senegal>

Stakeholders

Stakeholders

Function : Contractor

Conseil Départemental des Yvelines

<https://www.yvelines.fr/solidarite/cooperation-internationale/>

Function : Construction Manager

ONG Le Partenariat

Nicolas Dupuy, Directeur Technique Le Partenariat - Coordinateur Sénégal / Mail : plslois@orange.sn / Tél : (221) 33 961 46 51 ou (221) 77 535 38 86

<http://www.lepartenariat.org>

Function : Company

Habitat Moderne

Richard Somda

Structural Work

Function : Others

Association la Voûte Nubienne

Samuel Rodrigues, Responsable Pôle Technique / Mail : samuel.rodrigues@lavoutenubienne.org

<http://www.lavoutenubienne.org>

Technical Expertise

Function : Others

Regional Development Agency of Matam

<http://www.ardmatam.sn>

Technical Partner

Function : Others

Regional Urbanism Service

Technical Partner

Function : Company

BOROM DAROU

Oumar GUEYE

Finishing touches

Function : Company

NIANG & FRERES

Assane NIANG

Metal joinery

Function : Designer

AL-MIZAN. Architecture, développement, écologie au Sahel (Nouakchott)

m.hardy.architecte@gmail.com

architectural conception and technical expertise

Contracting method

Separate batches

Type of market

Global performance contract

If you had to do it again?

An integration workshop was embedded to the project, and the production estimates of these workers (from France) have not been done, which resulted on an additional cost.

Building users opinion

"A Nubian Vault, the wind can't carry it away, the wind can't break it, the rain can't come in, and if there were a fire here, earth doesn't burn... So it is really good. If you compare, the Nubian Vault method is cheaper than cement. If we could, the whole village would be Nubian Vaults."

René Ndong and Brigitte Phiaw, Nubian Vault customers

"Housing issues are extremely important issues for us, for the environment and it is proven that living and housing conditions are what contributes the most to the health and well-being of populations. The Nubian Vault matches perfectly our resource management policy and our fight against poverty, because it improves the living conditions of inhabitants in rural areas."

Abdoulaye Baldé, Minister of Environment and Sustainable Development - Senegal

Energy

Energy consumption

Calculation method : Other

More information

The energy performance of the VN building was first evaluated by dynamic thermal simulation and concluded that there was a significant reduction in energy requirements in the event that these Buildings must be refreshed or air-conditioned.

Renewables & systems

Systems

Heating system :

- No heating system

Hot water system :

- Individual electric boiler

Cooling system :

- VAV Syst. (Variable Air Volume system)

Ventilation system :

- Natural ventilation
- Nocturnal ventilation

Renewable systems :

- No renewable energy systems

Environment

Urban environment

The Maison des Yvelines is located along a highway and therefore benefits from high visibility. There are some shops around but its not a busy place.

Products

Product

Adobe - Mud Bricks (traditional/cut laterite)

Local informal production

none

Product category : Table 'c21_china.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 = '6'

Available widely

Energy performance = thickness of the walls because static brick and not expensive



Bricks with pebble-incrusted outer surface

Local informal production

none

Product category : Table 'c21_china.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 = '6'

Brick of banco (adobe) in which there are stones engraved on the part exposed to the outside in order to better hang the coatings (cement mortars> no lime available in africa)

No maintenance required

Enables the use of earth architecture for urban / institutional clients who do not plan to maintain



Costs

Construction and exploitation costs

Total cost of the building : 150 000 €

Life Cycle Analysis

Eco-design material : The use of the VN technique allowed 324 t CO2 emission savings on this building.

Comfort

Measured thermal comfort : The inertia of the Nubian vault construction provided by the high thickness of the earth walls is characterized by a strong attenuation of the temperature variations and the variations of humidity inside the building VN.

Acoustic comfort : The Nubian vault construction allows a high acoustic comfort (thickness of the walls).

Contest

Building candidate in the category



Energy & Hot Climates



Low Carbon



Users' Choice

