Raymond Queneau media library in Ris-Orangis

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Primary energy need :

67.23 kWhep/m².an

(Calculation method : RT 2012)

ENERGY CONSUMPTION

Economical building — *Building*

< 50	A	
51 à 90	B	B
91 à 150	C	
151 à 230	D	
231 à 330	E	
331 à 450	F	
> 450	G	

Energy-intensive building

Building Type : Library, documentation center
Construction Year : 1930
Delivery year : 2023
Address 1 - street : 5 rue Eugène Freyssinet 91130 RIS-ORANGIS, France
Climate zone : [Cfb] Marine Mild Winter, warm summer, no dry season.

Net Floor Area : 480 m² SHON RT
Construction/refurbishment cost : 2 200 000 €
Number of Seat : 45 Seat
Cost/m2 : 4583.33 €/m²

Certifications :

General information

This new community equipment aims to be a friendly cultural place that is both a place of learning, reflection, stay and exchanges.

It consists of three main sets:

- Spaces dedicated to the public: reception, the “Image and Sound” space, the “Adults” space and the “Youth space”. From the reception, all the public spaces will be visible.
- Technical spaces;
- Mezzanine staff areas.

It is largely open to the outside. The fittings allow obvious connections between the interior and the exterior, offering the possibility of reading in a garden.

Building users opinion

The building has just been delivered, so users do not yet have much perspective on the occupation of the building. Nevertheless, they are very satisfied with the natural light provided by the place and the sun protection.

If you had to do it again?

Everything did not work according to the objectives of the project but at the cost of difficulties to be overcome:

Brick: the condition of the brick and its exact nature were very difficult to diagnose. The layers of paint and the tags as well as the interior cement coating had modified its structure, raising fears of its decay. A chemical test revealed the presence of chlorides but without giving any repair solution.

We originally prescribed a scrub, but even the finest of micro-scrubs dug into and damaged the brick. In addition, we couldn't get the layers of tags that remained on the joints removed. We arrived there by consulting a specialized company to perform mechanical sanding and the removal of the old joints manually to restore a satisfactory surface condition to this white Lardy brick, which is almost a century old. This company (FLIPO) was subcontracted by the mason (DESTAS & CREIB) dependent on lot 01 initially in charge of this service. All this search for treatment during the construction site resulted in a very big delay in the schedule. In conclusion, this service should perhaps not have been part of the Major Works lot, which is too general, but of a specific lot, in order to have professionals with the appropriate knowledge and tools from the start of the site.

The facade: the brick being laid in a simple filling bed between and on very corroded IOP irons, it is therefore not considered to be a watertight wall. We had to build the coat wall from the inside. The difficulty for the company was to deal with the air gap and to install the rainscreen “upside down”. This particularity had not been properly taken into account by the company, our documents had probably not been explained enough in the consultation file. Cleats had to be fixed on the existing cement coating on the back of the bricks to then staple the rain screen to it from inside the building. Then the thermal and acoustic linings, the partitions and the finishes could be made in the traditional way.

The concrete was very carbonated because it was badly damaged by the leaks. The entire steel coating layer has been purged, sometimes quite deeply, until certain steels have been replaced. The low thicknesses prevented any fixing in the structures or the concrete vault. The steel structure of the canopy was placed by clamping on the trusses.

The site would nowadays be unbuildable because it is too close to the railway tracks. The reconversion was therefore the only possibility to reuse this place.

See more details about this project

https://deso-architecture.com/projet/nouvelle-mediatheque-r-queneau-dans-la-grande-halle-freyssinet/

BIM approach

The design studies and site monitoring were carried out in BIM on Revit.

The model was also given to the MO, at its request, at each stage of the studies and in the completed works file.

Photo credit

Daniel Rousselot, Céline Masson, Luca Serres, Magali Lenoir

Stakeholders

Contractor

Name : GRAND PARIS SUD ESSONNE-ESSONNE SENART
Contact : M. Denis DURINGER, d.duringer[a]grandparissud.fr
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Construction Manager

Name : DE-SO Architectes
Contact : Magali LENOIR, m.lenoir[a]de-so.com et Céline MASSON, c.masson[a]de-so.com
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Stakeholders

Function : Thermal consultancy agency

SWITCH

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Fluids, Thermal and Environment Design Office

Function : Structures calculist

IN4

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Function : Structures calculist

ALTIA

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Acoustic design office

Contracting method

Other methods

Type of market

Other

Other type of market

Complete mission MOP Law

Allocation of works contracts

Separate batches

Energy

Energy consumption

Primary energy need : 67,23 kWhep/m^2.an

Calculation method : RT 2012

Envelope performance

Envelope U-Value : 0,64 $W.m^{-2}.K^{-1}$

More information :

Exterior walls from the inside out: interior facing in plaster thickness 1.8 cm - => - Biofibtrio type insulation thickness 5 cm, λ=0.039 mW/°K , R=1.25 m²°K/W - => - plasterboard 1.3cm - => - Insulation type biofibtrio thickness 12 cm, λ=0.039 mW/°K , R=3.05 m²°K/W Brick 11cm

Inertial exterior walls to the west of the digital space, from the interior to the exterior: interior facing in 5 cm clay plates - => - Métis type insulation, thickness 5 cm, λ=0.039 mW/°K, R=1.25 m²°K/W - => => - Insulation type biofibtrio thickness 12 cm, λ=0.039 mW/°K , R=3.05 m²°K/W Brick 11cm

Inertial shear wall to the north of the digital space thanks to a 20 cm shuttering block coated with plaster

Low floor from inside to outside: Linoleum 10 mm - => - Screed 6 cm - => - Foamglas type insulation thickness 10 cm, λ=0.038 mW/°K, R=2.68 m²°K/W - => - 15 cm reinforced concrete paving

Intermediate floor collaborating with 2 mm corrugated steel sheet exposed on the underside: 12 cm reinforced concrete (average thickness = 9 cm because of the undulations of the steel deck on the underside) - => - 2.5 cm leveling coating - => - linoleum 0.5 cm

Roof from inside to outside: reinforced concrete 8 cm - => - Foamglas thickness 18 cm, λ=0.042 mW/°K, R=4.29 m²°K/W - => - waterproofing membrane

Roof forming horizontal daylight on steel deck from inside to outside: plaster interior facing => - Biofibtrio type insulation, thickness 5 cm, λ=0.039 mW/°K, R=1.25 m²°K/W - => - ribbed sheet - => - rigid rock wool thickness 16 cm, λ=0.032 mW/°K R = 3.95 m²°K/W - => - sealing

Roof forming a vertical daylight with cladding from the inside to the outside: interior facing in plaster => - Insulation type biofibtrio thickness 5 cm, λ=0.039 mW/°K, R=1.25 m²°K/W - = > - ribbed sheet - => - rigid glass wool thickness 16 cm, λ=0.032 mW/°K R 4.10 m²°K/W - => - cladding

Indicator : I4

More information

Lighting limited to 6W/m² in electrical power, presence detection in corridors and service areas + dimmable in main rooms.

The building complies with the objectives of the BBC renovation Effinergie label (Cep ref – 40%).

Renewables & systems

Systems

Heating system :
- Urban network
- Low temperature floor heating

Hot water system :
- Individual electric boiler

Cooling system :
- No cooling system

Ventilation system :
- Natural ventilation
- Nocturnal ventilation
- Free-cooling
- Double flow heat exchanger

Renewable systems :
- No renewable energy systems

Other information on HVAC :
Double flow CTA with heat recovery with efficiency greater than 80%, maximum flow 2100 m3/h, regulated by CO2 sensor in the main rooms and electrical power of the fans less than 420W.

Smart Building

BMS :
Natural ventilation openings controlled on GTC with priority for direct use by the user by switches.

Environment

Risks

Hazards to which the building is exposed :
- Flooding/Slow flood
- Urban heat island

Risks measures put in place :
- Slab raised by 60 cm compared to the existing one with total remodeling of the public space to access it.
- Roof treated in a light color for a low albedo. Creation of a strip planted all along the building as well as a shaded reading garden in the gable. The purpose of these treatments is to weaken the heat island effect.

Costs

Construction and exploitation costs

Cost of studies : 200 000 €

Total cost of the building : 2 200 000 €

Additional information on costs :
Treatment of reused brick: €140,940
Repair of the existing concrete structure (concrete trusses + vault): €95,000

Circular Economy

Circular economy strategy

Phase in which reuse has been integrated : Preliminary design studies

Type of circular economy strategy implemented :

- Maximization of quantities on targeted products
- Targeting of areas
- Choice of non visible products
- Maximization of the carbon gain

Type of circular economy strategy implemented :

Reuse of bricks in situ

Quantified targets for reuse? :

510 m² of treated bricks

Integration of reuse into the written contract documents : Integration of the reuse specifically in the special technical specifications of the concerned batches

Validation protocol for reused materials : Yes

Validation protocol for reused materials :

Removal / sorting / cleaning / palletizing / storage / resting

Deposit validation form : No

Reuse : same function or different function

Batches concerned by reuse :

- Structural works
- Facades

For each batch : Reused Materials / Products / Equipments :

The Lardy bricks on the site, removed to create openings, were reused to fill in certain existing openings and to create extensions (entrance to the media library, fence of the reading garden): 510 m² concerned.

Reused materials rate :

The bricks deposited were sorted, cleaned, put back on a pallet and stored on site. They were then reinstalled on other parts of the building.

All the bricks have been sanded + water repellent treatment.

Logistics

Rehabilitation and reconditioning operations (if project concerned by a cleaning/demolition stage) : Yes

Storage of materials for reuse in situ (if project concerned by a cleaning/demolition stage) :

- On site, on a dedicated area not covered

Insurance

Consultation of the technical controller : No

Insurer : MAF pour les architectes

Discussion with the insurer :

No, not on the issue of reuse

Environmental assessment

Impacts avoided : water, waste, CO2 :

facades	14146.89	76.838895	5456.798499
Big work	13.143782	0.027035084	11.237682
	CO2 avoided (kg)	**Water consumption avoided (m3)**	**Waste avoided (kg)**
TOTAL	14160.03378	76.86593008	5468.036181

The reuse operation saved the equivalent of 113,280 kilometers traveled by a small car, or 129 Paris-Nice journeys, 512 rectangular bathtubs filled with water and 11 years of household waste for a Frenchman.

Economic assessment

Total cost of reuse : 120 000 €

Reuse quantified in the companies' offers? : Yes

Purchasing process for reused materials :

- Others

Purchasing process for reused materials :
In-situ reuse materials.

More details on the economic balance :

We wanted to reuse the brick removed for the extensions from the start of the project.

This approach was almost called into question during construction. The holder of the GO/façade lot who had this service in his market did not have the know-how and the tools adapted to the treatment of this brick which had been altered by the years, the coatings and the tags. There was talk for a while about the total replacement with new bricks (construction time extended as a result) or the application of a lime plaster on all the facades. This represented a real failure for us and a substantial added value for the construction site's budget.

We were lucky to have another company on site (the painting lot) which was also specialized in the repair of historical monuments and which had the skills and tools required in-house. We were therefore able to carry out this service without putting a strain on the budget and the carbon footprint of the operation.

New business model and financial balance :

We were also able to reuse the existing concrete slab. This had to be demolished and dumped in order to be able to backfill and isolate before creating a new slab higher than the existing one (PPRI zone). We were able to crush the slab and leave it in place. This allowed a volume to be evacuated and to treat waste reduced to 0 but also a saving on the volume of backfill to bring on site (saving of time, money and waste)

Communication

Communication on the process : No

Social economy

Social economy and professional integration :

- The removal, sorting and palletizing of the bricks reused in situ were handled by workers in professional integration. The same applies to the crushing of the existing concrete slab;
- One of the interior linings was made of Argilus partition, a raw earth plate;
- The thermal insulation used for the entire project (facades and in the partitions) was made of BioFib Trio.

For the site: 1,648 hours of integration managed with Dynamique emploi.

Circular design

Responsible consumption :

In order to limit the environmental impact, and to move towards **responsible consumption of materials and energy** , both for the construction site and the life of the media library, several actions have been implemented. Regarding the choice of materials, the reuse of bricks (including selective removal, cleaning and refitting), the choice of biosourced insulation (hemp wool, linen and cotton) and the use of raw earth partitions with an earth coating have considerably reduced the carbon impact of the building. In addition, the bioclimatic design will make it possible to limit energy consumption needs during the use of the building. For this, a free-cooling system is set up, the openings for the natural ventilation air inlet are arranged on the facade behind solar protection and low plantations in order to bring in the freshest possible air. The light-coloured coating on the roof provides a favorable albedo for the building, which will thus store less heat and will therefore have a reduced need for consumption. On the other hand, heating is provided by the heat network of the eco-district, the source of which comes from geothermal energy and a wood-fired boiler room.

The existing Halle Freyssinet was initially an alcohol storage warehouse (Quartier des Docks des Alcools) in the immediate vicinity of the railway tracks.

The project therefore consists of a complete restructuring of the building and a change of use by transforming it into a neighborhood media library.

Functionality economy :

The existing hall is a resource for the new project. The work carried out with the companies to preserve and adjust the bricks, as well as the meticulous repair of the concrete structure, gave the possibility **of extending the life of the structural materials** of the project. For the materials that have been added to those already present, great vigilance has been brought to their quality so as to select only the most durable materials requiring little maintenance over time.

Eco-design :

All the design elements allowing responsible consumption come from the work methodology oriented around **the eco-design** of the building. The constraint of the location, volume and compactness of the hall are dealt with by the choice of breathable biosourced insulation, raw earth partitions bringing back thermal inertia for summer comfort and the installation of passive solar protection and cooling by free cooling.

At the scale of the district, eco-design is reflected in the management of rainwater collected in the planted beds and the shaded garden created in the extension of the reading spaces as well as in the valleys of the forecourt. These vegetated sets thus contribute to creating an island of freshness to fight against the warming of the district.

The rehabilitation project for this Halle was also designed on the principle of adaptability and reversibility. All of the partitions are partitioned with a light structure. The mezzanine created is held on an easily removable central metal structure. The floors are held cantilevered, thus making it possible not to touch the existing structure of the building. The building can thus regain its initial volume, be transformed into a restaurant, offices, co-working spaces or even a concert hall!

Sustainable supply :

Sustainable supply results in the treatment of the existing concrete paving which has been crushed and left in place at the bottom of the backfill. This solution

made it possible to avoid numerous passages of lorries, both for the evacuation of the waste and the transport of new backfill.

Local and biosourced materials (insulation, clay partition), heating of the building is provided by the heat network of the eco-district, the source of which comes from geothermal energy and a wood-fired boiler room.

Recycling :

The under-slab insulation and the concrete shell were made of Foamglas, an insulation derived from the recycling of car glass and off-cuts from their production.

On the roof, the foamglas comes from recycled glass, while the Biofibtrio is partly made of cotton from a French recycling industry.

Health and comfort

Comfort

Temperature level :

According to the STD, 99% of the hours of use will be below 28°C.

Acoustic comfort :

The acoustics were worked on at all stages of the project. The new slab on the ground is detached from the building (regupol), the mezzanine has a structure that is also detached from the structure of the existing building. This makes it possible to isolate oneself from outside noise, in particular that of the RER passing on the rails near the building, even if the latter enter the station when they pass in front of the building and are therefore much less noisy.

The internal acoustics have also been treated with a flexible acoustic lino floor and perforated plaster linings. In front of the windows are installed translucent acoustic curtains.

Visual comfort :

The light is essentially zenithal which brings a large quantity of light without glare.

The south facade is wide open to the forecourt, a shade 2.5m wide is installed there, allowing to filter the light and the excessive calorific contributions. The translucent curtains also contribute to the light supply without hindering readers.

Quality of life and services

The media library is a communal service provided by Grand Paris Sud. Located in the heart of the Dock de Ris eco-district and near the RER station, this facility will be a place of meeting, work and calm. The reading room is extended by a reading garden offering an intimate, calm and flowery place in the shade of a pergola to settle in to work or simply read a book.

The team in place wants to set up many events for users and residents of the neighborhood.

The forecourt laid out all along the media library should accommodate a market.

Contest

Reasons for participating in the competition(s)

This project of rehabilitation was designed to optimize the resources of the existing building as much as possible in order to move towards frugal construction. This working method influenced the entire project and resulted in the success of the worksite and the involvement of all the companies on all the subjects, in particular on environmental issues. Thus, through its design, its program and the specificity of the existing hall, the project responds to the **pillars of the circular economy** and thus becomes a committed reference for the agency.

In order to limit the environmental impact, and to move towards **responsible consumption of materials and energy**, both for the construction site and the life of the media library, several actions have been implemented. Regarding the choice of materials, the reuse of bricks (including selective removal, cleaning and refitting), the choice of biosourced insulation (hemp wool, linen and cotton) and the use of raw earth partitions with an earth coating have considerably reduced the

it possible to avoid numerous passages of lorries, both for the evacuation of the waste and the transport of new backfill. Finally, the insulators used in the project are virtuous by their composition implementing elements from **recycling** . On the roof, the foamglas comes from recycled glass, while the Biofibtrio is partly made of cotton from a French recycling industry.

This media library, which through its program induces an **economy of functionality** , is a project thathighlights the **pillars of the circular economy** through its design and implementation with committed companies.

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