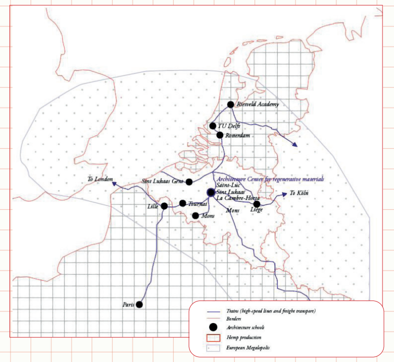
ARCHITECTURE CENTER FOR REGENERATIVE MATERIALS

How could we think Architecture in a world where resources are limited?

This question must be the most difficult and imporant question of our century. Regarding to the general topic, the living cities, the program(s) we suggest would experiment producing living architecture.

The « Architecture Center for regenerative materials » is thought as an eco-system, a place to experiment, sensibilize and produce around the regenerative materials.

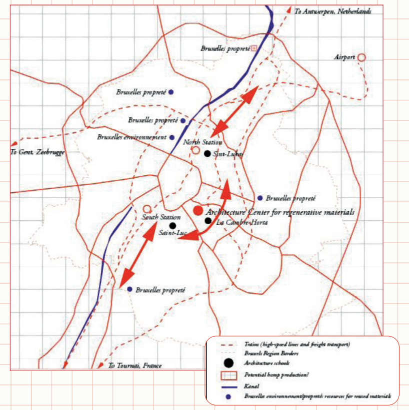
Indeed, the building is divided into three main entities, all linked together. The Center is thought as a research hub, facing teaching and experimenting issues.



A European facility

As a congested European metropolis, integrated into the network of the European megalopolis, Brussels is highly dependent on supply circuits for raw and, above all, processed materials.
But this centralized position is also a huge issue for thinking an alternative living-producing process for cities.

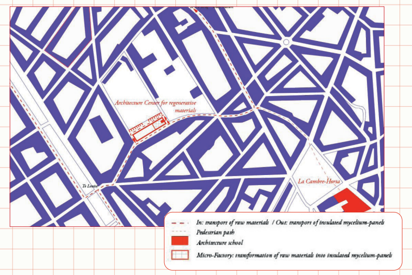
First, the project has a central place within a northern european schools of architecture network, linked by high-speed train lines.
Moreover, the freight corridors are also well developed. The hemp produced in Netherlands in France could come by train into the Brussels Region to be transformed into building materials within the city itself.

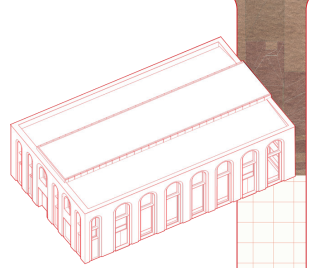


The hemp produced out of the Region can arrive through the South station or the North station, or through the Kanal. Placed close to the Ring, the Architecture Center for regenerative materials can be delivered in raw materials easily.

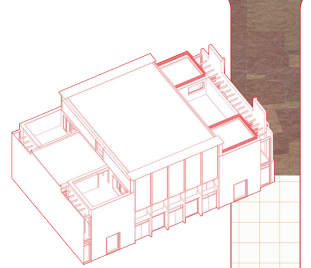
Trying to emphasize circular processes, the producing factory, the "Micro-Factory", recovers brusselian wastes as substrates for its insulating panels.

Raw materials are delivered by trucks which can turn around the building, thanks to a back access. Stocks are placed along this access. Than, raw materials go to the load lift, are transformed into building materials that , in the other way, can be delivered in the all city

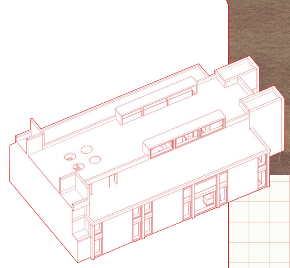




The « Macro-Factory », is thought as a big experimenting room, where could be built scaled-one prototypes with living or natural materials.To emphasize what is experimented in real, there are for classrooms built to receive the theorical lessons, and cloakrooms.
Not only thought as a place where can be experimented prototypes, the "Macro-Factory" is a prototype by itself where would be tried a "growing-insulation", based on the panels produced in the "Micro-Factory".



The « Forum » is the "public space" of the program. It links all the facilities together, according to each user and timeline.
It could be a space for a daily visitor, that comes to visit the material library, watch prototypes, who could use the refectory.
It must be a place to receive weekly users who come for profesional or universitarian trainings, thanks to its dormitories and bathrooms.
All thoses users can meet each other and exchange about living materials and architecture issues.



The « Micro-Factory » is a producing place where insulated growing mycelium-based panels are produced on its groundfloors. Growing panels drive us on a post-carbonated direction for construction, facing both the reduction on the use of raw materials and the thermical renovation issue, while transforming empty floors in producing places.
Thought as a link with the global pedagogical issues of the program, a free-access material library takes place in the former library.

View from the back of the "Macro-Factory", where the raw materials are delivered by trucks and stocked along. We can also see the public little pedestrian bridge.

View from the Paul Spaak street: The existing roof of the former XIXth electric building has been demolished to create a new roof. The existing windows have been enlarged and the frames changed.

Southern façade of "The Forum". The Forum draws its line, a huge wooden timber frame grid, with its higher part assumed as blind curved-mycelium panels.

A programmatic ecosystem

The weekly user

On monday morning, people in training start with a quick meeting point in the refectory. After talking about the general topic of the week training, they would go directly on the left, to classrooms, where they could receive some theorical aspects.

Than, they can start with the first experiments, in the big experimenting room. At each midday, they could all meet each other in the refectory, where they could cook for themselves.

At the end of the week, a big prototype could be built with natural and living materials, earth, wood, mycelium, hemp, thanks to the knowledge learned during the training.

After each day, the users can go to cloakrooms to wash themselves before going to the dormitory, or having a drink on the courtyard.

Axonometry section of the "Micro-Factory": At the groundloor is the laboratory which controls the production process of the insulated mycelium-panels. The raw material is stocked and sorted before going to the first basement through the load lift, at the east of the building, directly linked to the street. All basement are used as incubators, producing places where the mycelium-panels grow.
The former library becomes a material library, where can occure exhibitions related to on-site experiments.

The daily user

While entering "the Forum" from "rue de l'ermitage", several choices appear to the visitor.

First, he could cross the double-height space, seeing people eating and discussing upstairs, through a wooden timber frame.

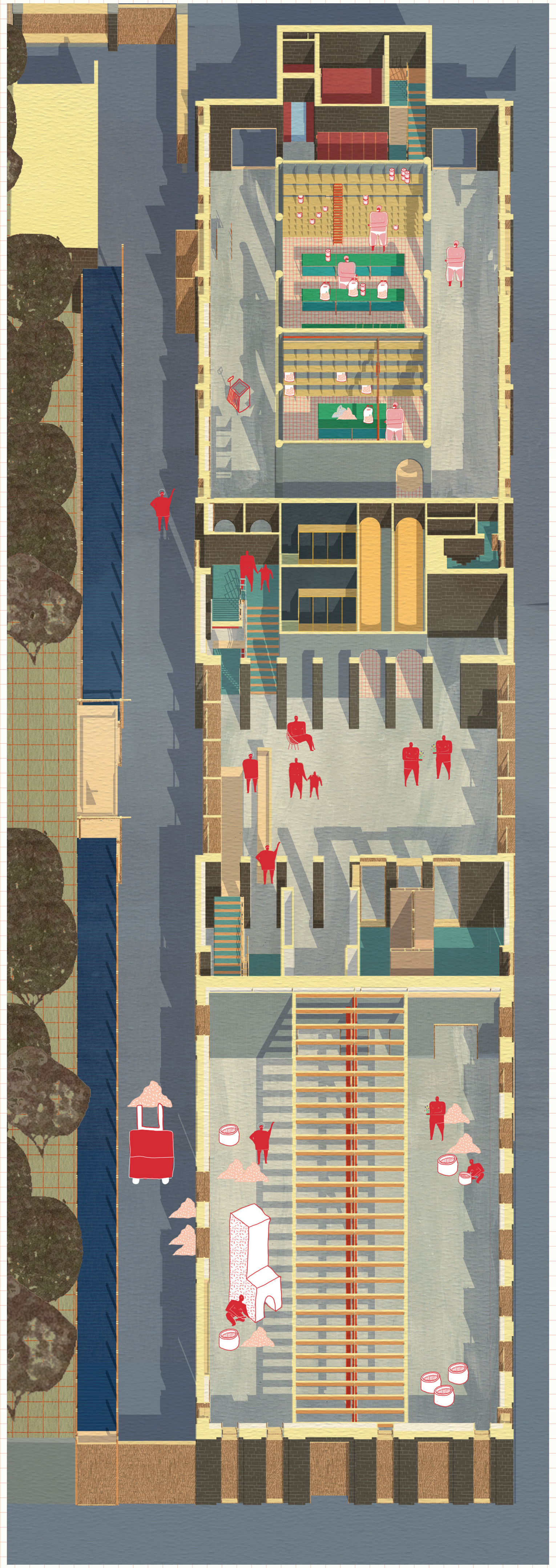
He could go to this refectory. From this place, the visitor could see an exterior courtyard that drives to a pedestrian bridge, that gives a point of view on the back of the building or on the top of the water reservoir. No one asked him a ticket, this passage is public.

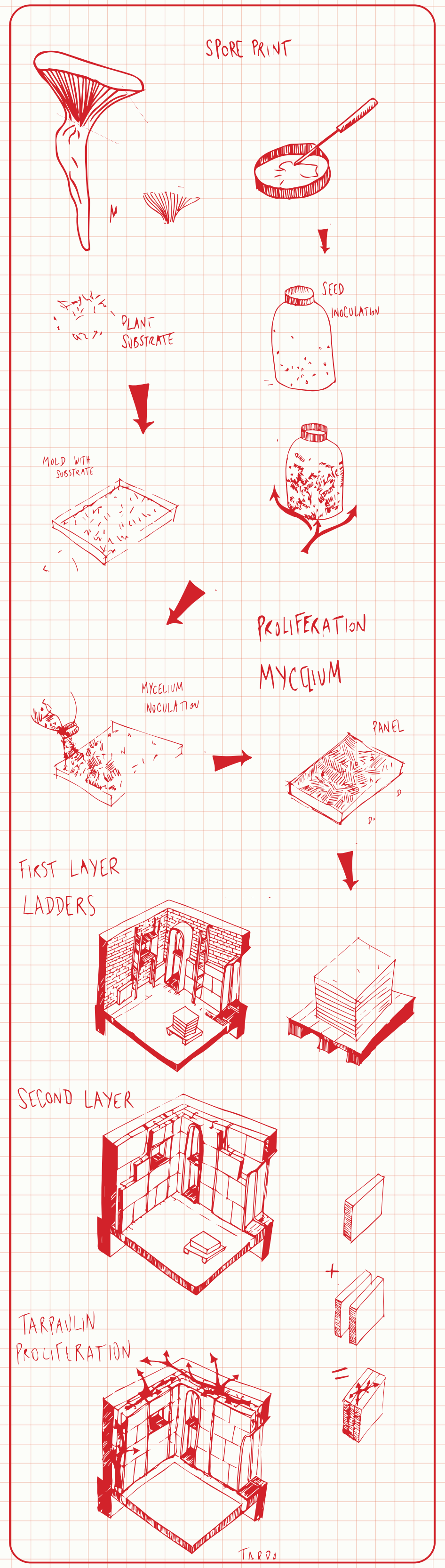
Coming back from the courtyard, he could have, on the right, a view above some prototypes under construction in a huge experimenting space.

To have more informations, the visitor could go on the other direction, directly to the material library, where are exposed both on-site researched and produced than natural materials found in the construction world.
Some conferences about living architecture would be organized in the existing amphiteater twice a month. This one was acoustically insulated with growing curved-mycelium.

Cut axonometry of the "Forum": The "Forum" is the signal of the new building. The new volume expresses with its materiality what's going on inside the building. Indeed, the main facade is realized with curved insulated mycelium-panels that fulffil the wooden structure. Dormitories take place behing this blind vegetal screen. Light come from courtyard created by removing some existing roofs. The groundfloor and the refectory are situated behind the glass façade, expressing the public identity of this part of the building. The amphiteater, according to the existing building, is still conncected to the ground floor, for some events. The rest of the basement works with the "Micro Factory".

Axonometry section of the "Macro-Factory": The existing roof and floors have been demolished to create an inhabited beam which includes, at the first level and linked with the refectory, four classrooms and, at the second level, linked to the dormitory, the cloakrooms.
At the ground floor, the experimentig room uses the light and the height generated by the new space along the existing facades. At the back, the wooden regular structure is built for stocking raw materials, which can be manipulated easily.





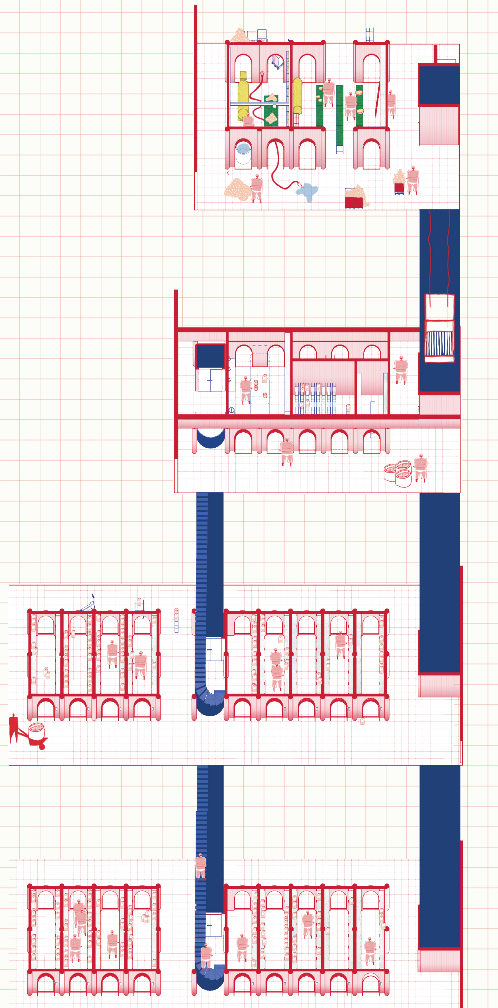
From raw to building materials

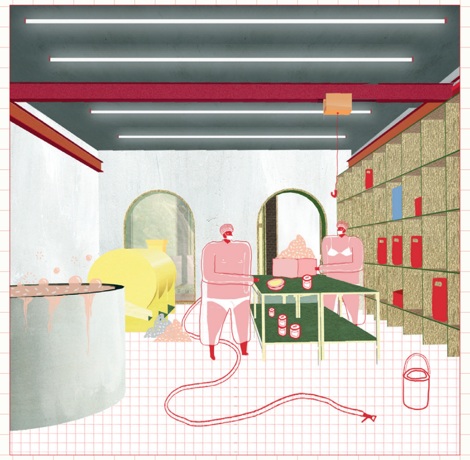
The Mycelium production chain

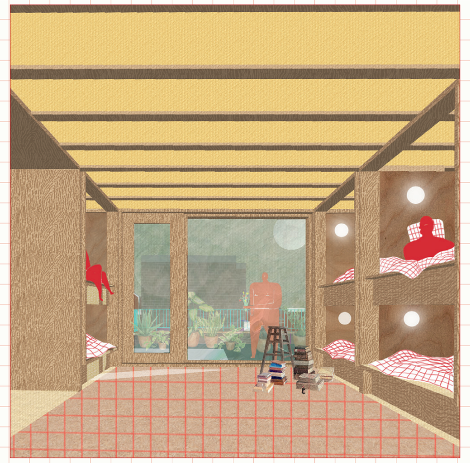
Mycelium is a living matter, which works by proliferation. In fact, unlike most other construction materials that work with a binder whose production requires excavation, cooking and whose setting is chemical and irreversible, the mycelium works as a growing network.
From a cloned cell, the mycelium is inoculated into a sterilized plant substrate, hemp, within a mold in which the shape and growing conditions are controlled.
The substrate is delivered and stocked at the back of the building. Than, the plant substrate is cleaned and sorted by size, species and then arranged. In the same time, the mushroom is cloned. The materials go down to the next step with the load lift.

This is when the plant substrate and the mushroom meet each other, in sterilized room, after being put together in molds.

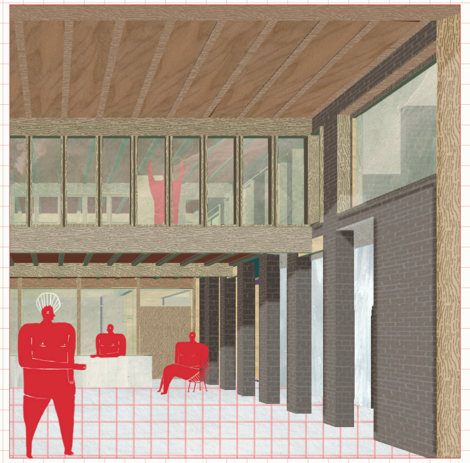
The last step is the proliferation process, on the incubators. The mycelium will proliferate, linking the substrate together in the mold form. When ready, the grown panels can go upstairs for being palletized and packaged before delivery.



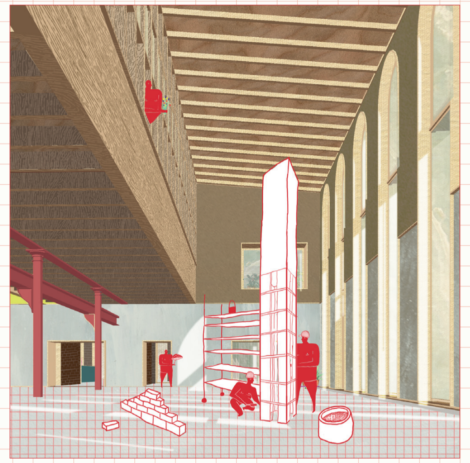




View from the dormitory. The students or profesionals who come for a training could stay a week within the dormitory. There are 72 beds divided into 4 rooms. There are commun showers and individual lockers in the common parts. Each dormitory accesses to a courtyard thatt brings natural light and offer an exterior space to rest.



View from the main entrance. Entering through the double-eight entrance, we can read the wooden timber frame grid in all details and geometries. At the first floor, the refectory creates view on the entrance and is opened on an public exteriori courtyard.



View from the Macro-Factory: The experimentation room is crossed by the inhabited beam. The "catedral sapce" enables to build huge prototypes. At the lower part, the walls are protected with stainless steel plates while the higher part is covered with earth plasters.