CS938

Concrete filter

Strategies for a healthy building

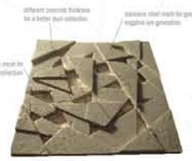
The study and contaminated air of the cities and the more and more use of electronic devices inside the habitat spaces are the main factors of the decrease of live quality in current homes.

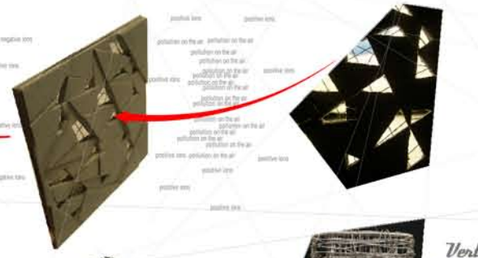
Headaches, uneasiness, stress, etc... are problems due not only for the highly rhythm of lives, but also for our contaminated surrounding, even inside the buildings.
So, we think about some strategies in order to increase the quality of buildings inside air:
1. Negative ion generation
2. Correct ventilation
3. Humidity control
4. Proper Temperature
5. Correct illumination
6. Removal of the inside dust
Through the study of all of the parameters, which define the above strategies, we came into a conclusion that the windows of the houses concentrate all of the stated.

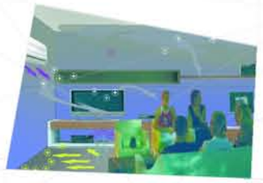
Therefore, we suggest a filter which is able give quality (no dust, negative ion generation) to the air that comes inside the homes from outside. This filter should be configured by the users.
We propose a filter made in cement due to its easy shape generation and its open air oxidation -humidity, sun, chemical agents... - over other materials like plastics.

Health measurement mesh

Usual relationship situation | Ventilation applied | Ventilation and dry filtered ionization applied | Ventilation, dry filtered ionization and humidity applied | Ventilation, dry filtered ionization, humidity and pressure dust control applied







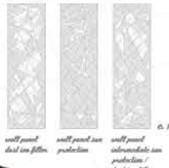
"Where do you locate the window-spaces? You realized that depending on the position-light focus you get different feelings. So, draw all the possible locations of the windows and afterwards tell me which one is the best. As a matter of fact, why did you draw five room with this shape? There in other shapes will have possibilities and place the spaces for windows and doors." La Corbusier

Kind of panels

We design three different wall panels and twelve different window panels.
The panels are made of concrete with two different embedded meshes. One stainless steel mesh (which filters positive air ions and changes them into good negative ions), and one nylon fibre mesh that (spritzer dust due to an electrostatic charge become through the air movement. The thickness of the concrete varies in the panel allowing a better dust collection.

Wall panels (3 x 0,9 m)

The first wall panel is design for a high dust (no filtering. In this case low sun-coming light and sun control is performed.
The second wall panel has a high sun coming light and sun control, but a low filtering is carried out.
The third kind of wall panel is mid situation between both former panels.



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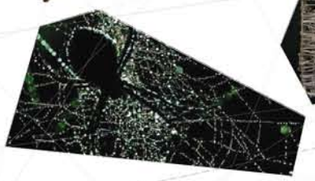
wall panel dust (no filter. | wall panel sun protection | wall panel intermediate sun protection / dust (no filter.

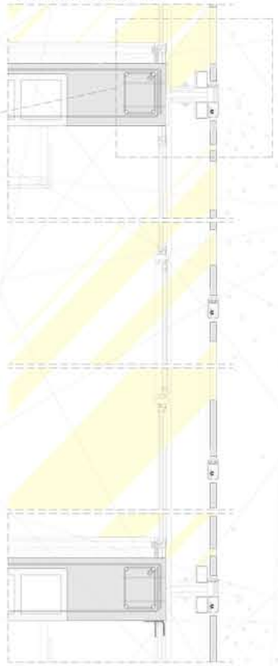
Key references

As well as the spider uses its web (spider the insects flying on the air, we use this technique in combination to the electrostatic charge of the nylon fibre due to the friction of the air to capture the dust.

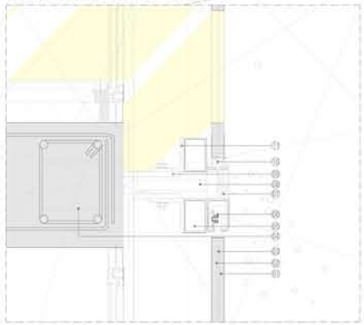
On the other hand the same effect is used to filter the air through a stainless steel, which get from the air the positive ions (negative for human beings) and give it negative ions (positive for human beings)



Vertical section e. 1/5



Construction details e. 1/5



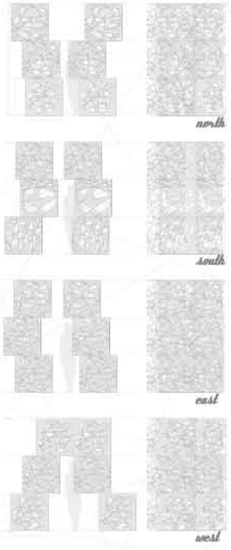
LEGEND
01. Glass-fibre reinforced concrete (GRC) of 3 cm. thickness
02. Nylon fibre mesh embedded in GRC
03. Stainless steel mesh of 1.2 mm. diameter
04. Tape stock screw fixider of 7 mm. diameter
05. Rectangular void stainless steel profile 35X 80 X
06. Rolling system for a moving panel
07. Vaporized water sprinkler
08. Water pipe of vaporizes water sprinkler
09. Stainless steel L profile L 15 5
10 Rolling system for a moving panel
11. Stainless steel L profile L 8 3

Horizontal section e. 1/20

Windowpanels

Regarding the window panels, we designed them taking into account the relative height (2 – 0.9 m., 0.9 – 1.8 m. and 1.8 – 2.7 m.) of the window and the orientation (north, south, east and west).
Dividing the window in nine small moving panels (0.3 x 0.3 m) gives the possibility to the user to manage the configuration of this window spaces. Moving each panel the user may let enter more light at one relative height of the window, while is able to filter the incoming air at other relative height position.

The percentage fibre-concrete is defined for each panel taking into account its orientation and relative height position (maximizing the relation between light entering and air filtering.



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Construction process

Practical application of the panels for a façade

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Implicit performance

Exploring the hybrid condition 1

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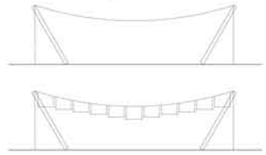
Application for a healthy city

We proposes another use for the panel. We apply it as an object in a city scale. The pollution generated by cars, motorbikes, etc. in big avenues of the cities might be reduced in order to avoid that this contaminated air arrives to the apartments. We plan a huge deck, made with the same concrete panels from the idea of the façade, but used in a horizontal structure and with dimensions 7 x 3 metres. This panels hang some stainless steel cabins, which are hold by a trained stainless steel pillars.

The work and composition of these panels are the same as used for the façade panels. This deck works as a protection and filtering agent for the air of the rest of the city. We also propose the space between the pillars and the stabilizing cables as a bike way (remind as a sustainable development of the Spanish cities). The pillars could also work as a holder of vegetation, increasing the-welfare state during the walk along the street.

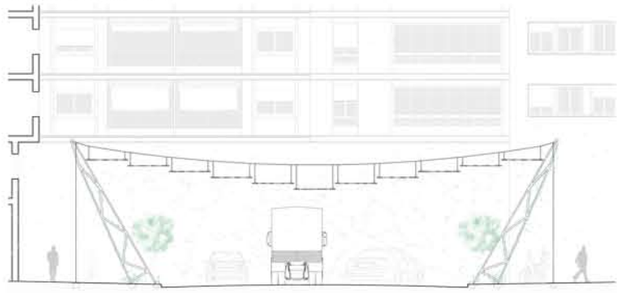
Structural diagram



Murcia energetic map

The more energetic zones, implies more pedestrian areas. Energy measured through traffic, pedestrian area, stores, illumination and noise.

Vertical street section



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Floor plan of the street

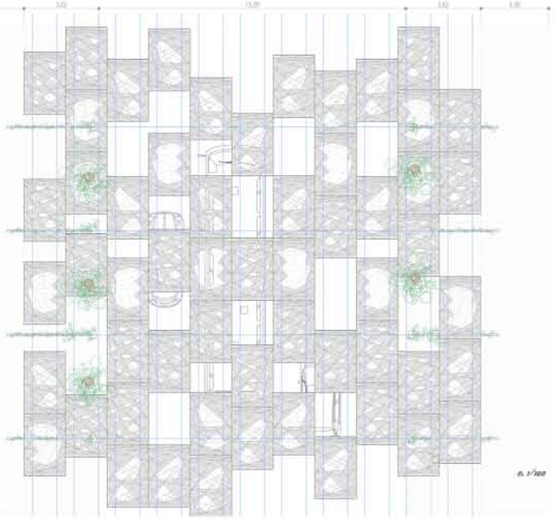

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Image 1 of the city deck

Image 2 of the city deck

Implicit performance

Exploring the hybrid condition 2