



**HAL**  
open science

# Habitable skins for comfort improvement in architecture

Daniel Estevez

► **To cite this version:**

Daniel Estevez. Habitable skins for comfort improvement in architecture. ENERGY FORUM 2011, Dec 2011, BRESSANONE, Italy. Solar Building Skins. hal-04118959

**HAL Id: hal-04118959**

**<https://hal.science/hal-04118959>**

Submitted on 6 Jun 2023

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution 4.0 International License

# HABITABLE SKINS FOR COMFORT IMPROVEMENT IN ARCHITECTURE

by Daniel Estevez, architect engineer, LRA lab, Ecole Nationale Supérieure d'Architecture de Toulouse (FR), ENERGY FORUM 2011

Architecture not only concerns a physical or technical realm. As everyone can learn from his personal experience, architecture is also a mean to create a specific ambiance because it acts on the perceived comfort of human being. In that sense, architecture constitute one of the central notions for the improvement of comfort standards and thermal perception. People have a natural tendency to adapt to changing conditions in their environment and the comfort they perceived is not only correlated with the exact thermal performances of buildings.

The acceptance of indoor climates by inhabitants is an important item for succeeding and resolve thermal issues. Thus, any progress in building thermal skin design must clearly include the behaviour of inhabitants as main part of the process.

Parts of projects of multifunctional skins using wood framing are presented here. Those projects of Habitable Skins were designed at the Ecole Nationale Supérieure d'Architecture de Toulouse (France) under the french research program called Learning From (EFFINOV BOIS, ANR). Each project consists in architectural skins proposal for an existing office building in the University of Bordeaux. Projects try to support behavioral adjustments and expectations of inhabitants that are working in these offices, in order to increase the capacity of control over environment. (<http://learning-from.over-blog.fr/> contact [daniel.estevez@toulouse.archi.fr](mailto:daniel.estevez@toulouse.archi.fr))

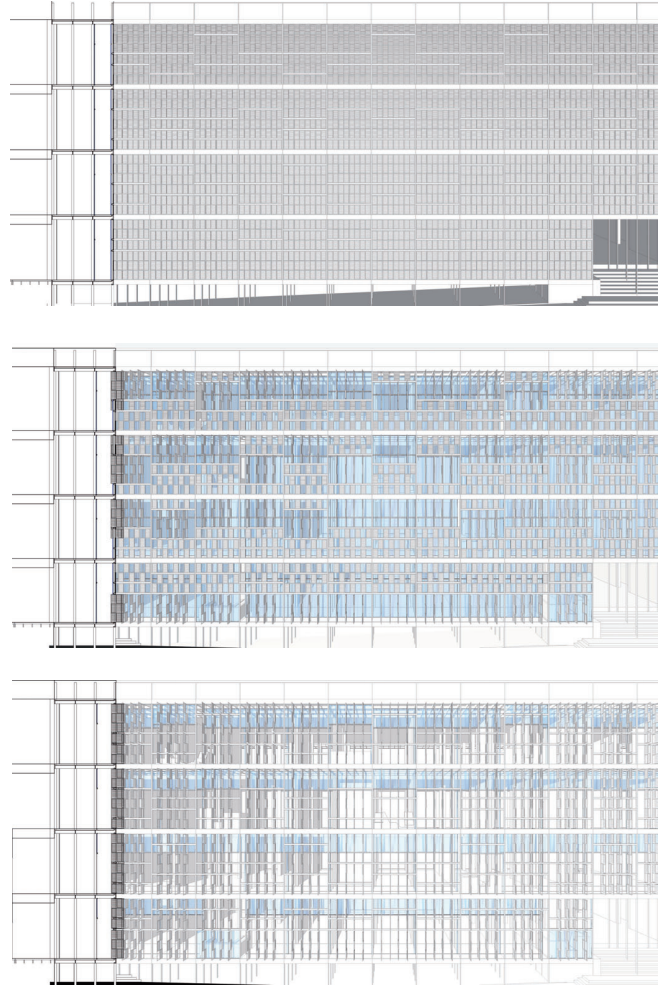
## ADDING OUTDOOR SPACES

Outdoor space is for free, adding habitable space can increase the value of buildings and thus reduce costs of external insulation.



## CONTROLLING DEGREES OF OPENNESS

Habitable Skin reinforce people action on their environment by offering them possibility of varying enclosures, this complex multilevel of wall's openness gives also a link with seasons.



## MAKING A SECOND WALL IN EACH BUILDING

Every building must have an invisible thermal wall that is added to the existing structure, such a «second wall» is the bounded outdoor space.



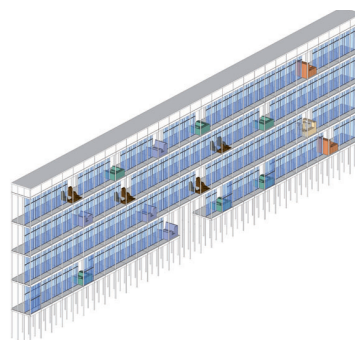
## PRACTICES PATTERNS : VIEW

The view is the key of well being in space, Habitable Skins must transform also indoor uses as well as indoor feelings of comfort



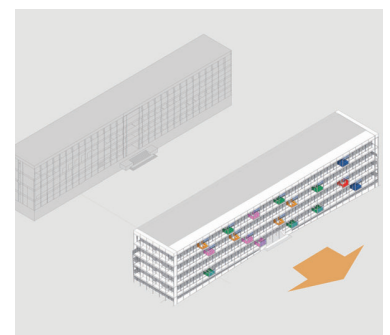
## PRACTICES PATTERNS : PLACES

Habitable Skins only exist as life places and not as technical buffer spaces, thus space of Habitable Skins must be articulated in order to support people involvement and micro-appropriations.



## RE-ORIENTING BUILDINGS

Bad orientation is the first cause of heating problems in existing buildings, habitables skins give them a new orientation, they turn houses toward sun.



ENERGY FORUM 2011

## **HABITABLE SKINS FOR COMFORT IMPROVEMENT IN ARCHITECTURE**

short speech of Daniel Estevez architect and researcher at the LRA lab in the National School of Architecture of Toulouse in France.

"I want to say few words about a research program that I run in my laboratory, and also with the help of students of my studio, part of the university master called "Learning From" that I lead with the architect Christophe Hutin in ENSA Toulouse.

This program focuses on the concept of Habitable Skins (accessible envelopes) in existing buildings using wood framing technics. We talk about renovation of buildings, not houses. This work is integrated in a more vast french program called EFFINOV-WOOD, that reflects more generally on "external thermal insulation systems". So us, we make various experiments of habitable skins (it's to say architectural projects) into different contexts (Office buildings in Bordeaux France or Social Housing in Johannesburg South Africa).

The first aim of our research is to study the relationship between architectural design and the improvement of feeling of comfort (perceived comfort) by inhabitants in existing buildings. (This issue can be linked of course with adaptive approaches to thermal comfort, but our work has nothing in common with modeling and calculation. It focuses on architectural design proposals)

So Habitable Skin is conceived as a tool for improving comfort and thermal comfort as well. I want to underscore four features of our skins experimentations (using an example from a project of a student) :

- First : we add outdoor spaces, (they can be "winter gardens" or "alcove terraces" etc.) the goal is to create a cushion of air around the building in order to improve the indoor climate. We call that "making the second wall" of a building, witch is an outdoor wall. Habitable Skins are non-airtight systems, they consist in additions of layers that are not airtight (shutters, curtains, thermal curtains, balconies...). But outdoor space (space without heating) is also a way to deal more easily with regulations (fire, accessibility etc. there is less constraint). And finally we add living spaces almost for free.

- Second : we produce devices that can be managed easily by inhabitants. For instance, in that project by making rotating shutters very articulated we give a lot of degrees of openness to the skin. That can lead to adapt the building with his environment with a high level of precision. It's also a mean to involve inhabitants in the life of the building witch is a criterion of comfort.

-Third : we add living spaces, and we can add more or less space according to the current orientation of the building. That's why Habitable Skin can be also a tool to correct defaults of orientation of existing buildings.

- Fourth : we manage the views from inside. The view is maybe the more important criterion of comfort in a room, we can live in a very small place but if we have got a good view it can be very comfortable, connected with nature etc. Managing the view is also a mean to transform the feeling of uses in buildings. In that example, taken from a habitable skin project for an office building, we want to increase the feeling that people are working together because they can see themselves during the day life of work.

Other features could be described, like Practices Patterns in HS, or the positive economic injection of this kind of additions of living spaces in existing buildings (cf. Tours Bois le Prêtre, Frédéric Druot).

Our different proposals and projects are always very simple. We learned it from our academic work in africa (see <http://learning-from.over-blog.fr/> ). And to conclude my speech I'll say that architects have to think about sustanaibility with the aim of simplifying technics, of taking distance from automation systems, and simplifying technologies in order that people, users, can keep control, and can be active, architecture is a mean for people to interact with context. In my opinion, interaction is a key word for the future. Thank you."