

## Thermal rehabilitation: assignment of balconies into conservatories; the « Libellules » case study.



Reto Camponovo<sup>1</sup>, Jean-Yves Magnin<sup>1</sup>, Peter Gallinelli<sup>1</sup>

<sup>1</sup>LEEA, Laboratory Energy Environment Architecture,  
Ecole d'ingénieurs de Genève, eig – Hes-so. Geneva, Switzerland

e-mail : [reto.camponovo@leea.ch](mailto:reto.camponovo@leea.ch)

web : [www.leea.ch](http://www.leea.ch) and [www.csbat.net](http://www.csbat.net)

# Main thematic



PLEA 2006 – Geneva.

**« spaces » and « function » in assignment of balconies into conservatories.**

**keywords :**

**space reassignment, comfort, rehabilitation, building physics.**

# The case study object



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## « Libellules » (english translation « Dragonfly »)

Built in 1968  
(prefabricated modular  
construction called  
« Balancy » situated in  
outskirts of Geneva

10 story high – 540  
apartements.

Total floor area 40'000 m<sup>2</sup>



From 1989 to 1996  
important readapting work  
to improve the cladding's  
thermal performance and  
repair some construction  
defaults.

*In addition all of the open  
balconies were simply  
closed ....*

# The present situation



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## « Unexpected » problems after closing balconies

Complains about the « confort » in the loggia (old balconies), *eg. too hot or too cold.*

Presence of moisture on the original « garde-corps ».



Many canvas blind unusable and guide rails that come loose.

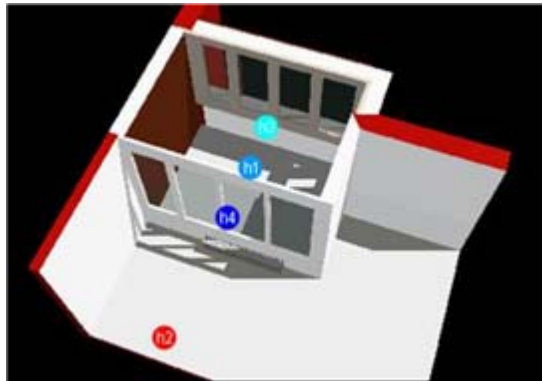


# The « technical-classical » oriented approach

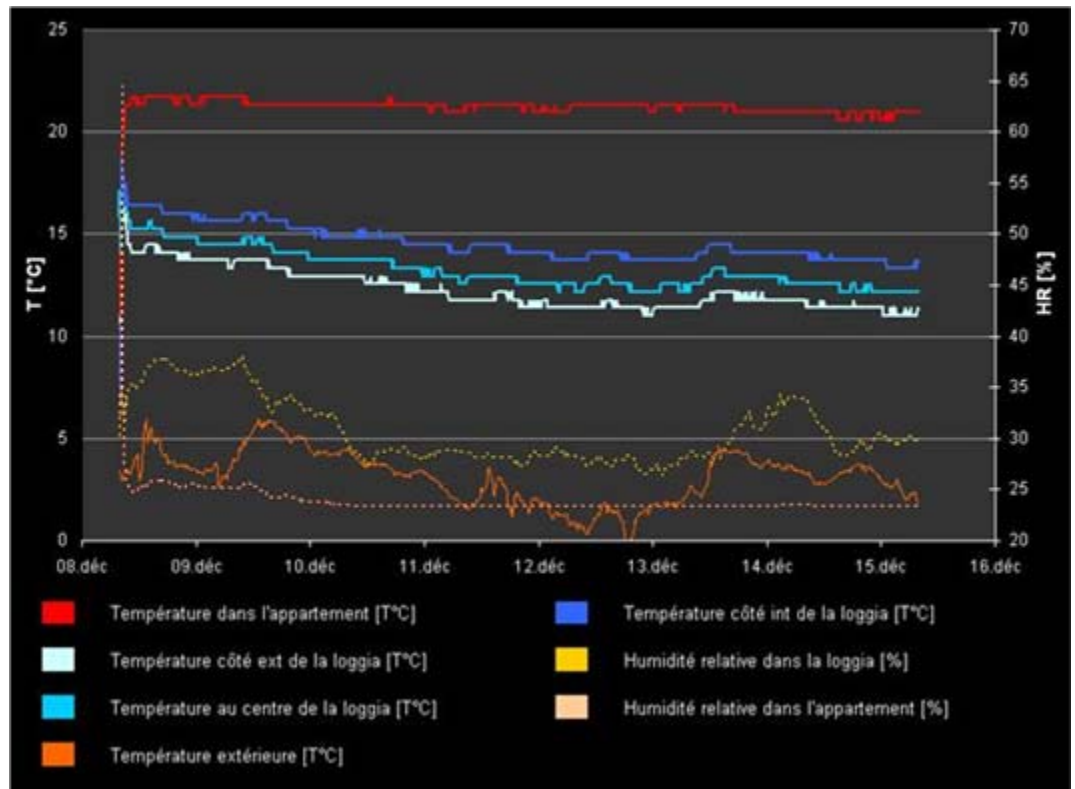
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## Assessment of building physics side

On site Hydro-thermal measurement ....



Using HOBO data acquisition units

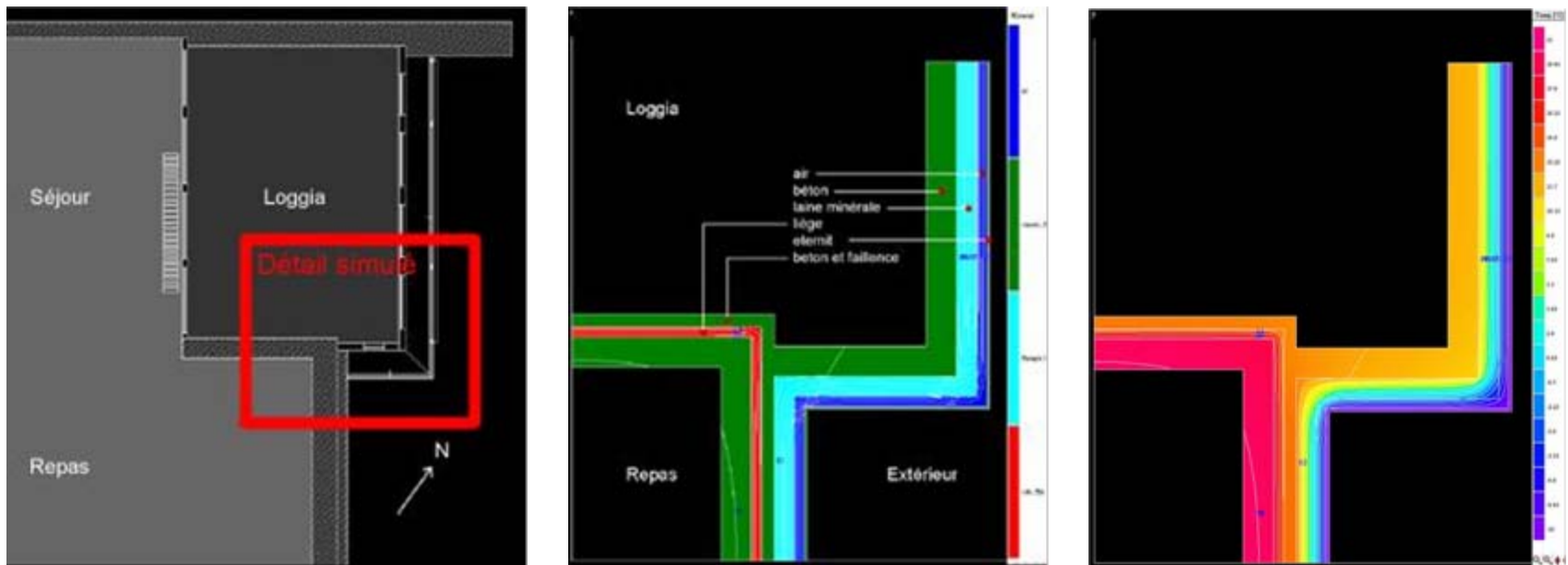


# The « technical-classical » oriented approach

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## Assessment of building physics side

Building parts performances .... (Uvalues, moisture, isotherms)



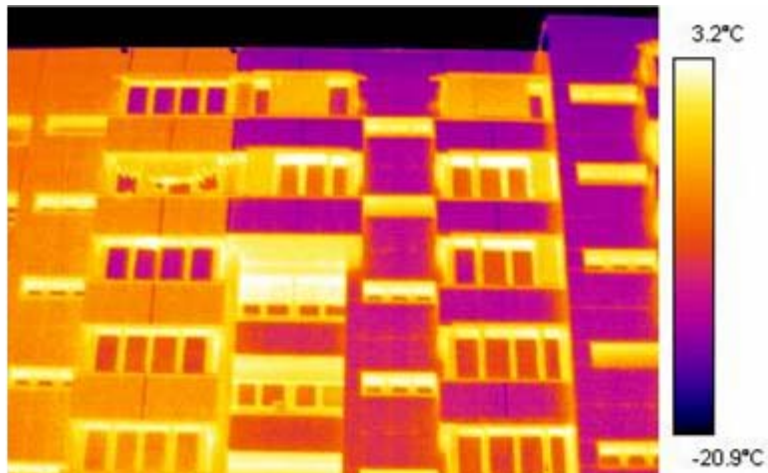
Using HEAT2 software and on side controls.

# The « technical-classical » oriented approach

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## Assessment of building physics side

Global building thermography .... (discovering a different readapting work)



Using FLIR infrared camera.

# The « technical-classical » oriented approach

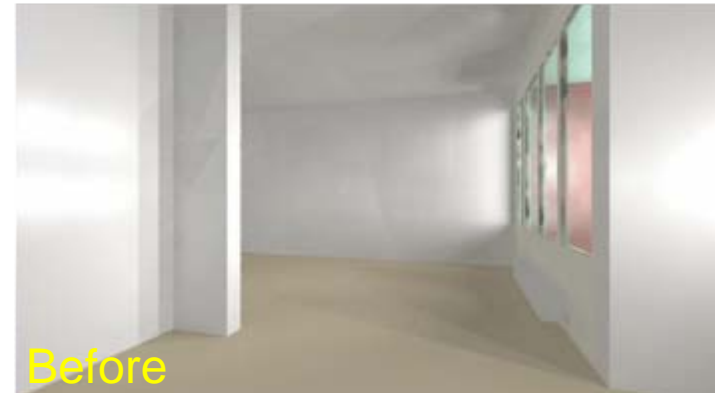
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## Assessment of building physics side

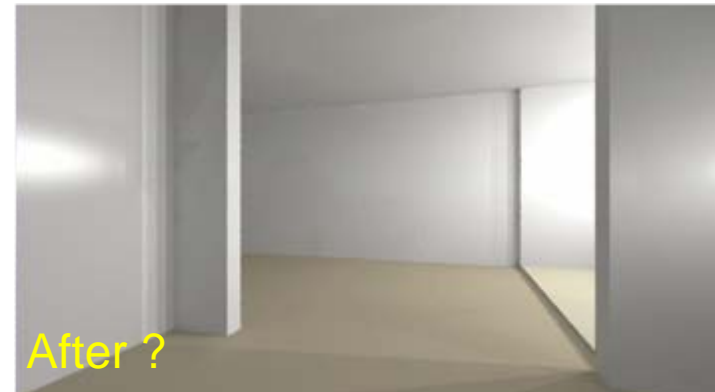
Natural light performances .... (depending of proposed solutions)



Today  
Actual situation (since 1990 after closing balconies)



Before  
Original situation (1968 without closing balconies)



After ?  
Proposed situation (200x removing old balcony-window)

(Exemple at 21-06, 12h00)

Using RADIANCE and ARCHICAD software.

# The « technical-classical » oriented approach



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## Overview of the evaluated solutions



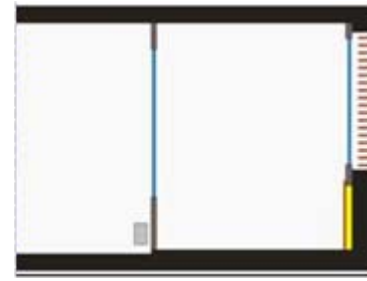
### Internal sun blinds 1

- economical
- blinds protected from wind and bad weather
- overheating more important
- don't improve the living natural lighting
- don't improve the thermal behaviour of space
- don't resolve the problem of space utilisation



### Internal sun blinds 2

- economical
- blinds protected from wind and bad weather
- overheating more important
- don't improve the living natural lighting
- don't improve the thermal behaviour of space
- don't resolve the problem of space utilisation



### External venetian blinds and re-insulating of parapet

- economical supportable
- blinds more robust and interactive with users
- improvement of the thermal behaviour of space
- don't improve the living natural lighting
- don't resolve the problem of space utilisation



### External venetian blinds, re-insulating of parapet and dismantling of old windows

- blinds more robust and interactive with users
- improvement of the thermal behaviour of space
- improvement of the living natural lighting
- more expensive
- solve the problem of space utilisation

# The « architectural-social » side of the study



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## Interview with the inhabitant

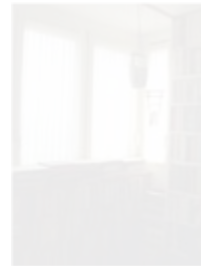
In conjunction with the technical studies, we made interview with the inhabitant about the usage of the « hybrid space » by using a questionnaire.



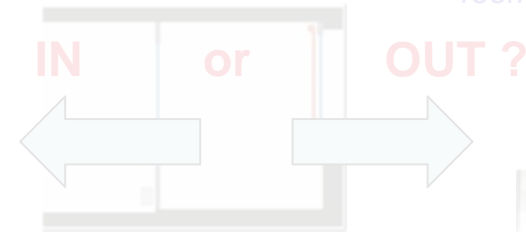
« hybrid space »



room ?



library ?



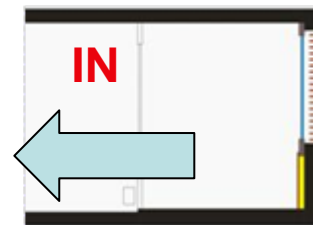
living ?



garden ?

The « true » problem is not (only) technical but is rather the way of using this space !

As soon this space will not be affected, such problem will still occur.



# Balconies in building, historical signs

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## Examples of space and function in balconies

**Tunis  
(Médina) :**



**social :** to see outdoor without to be see

**comfort :** natural ventilation  
sun protection

**Bilbao (sea border).**



**social :** to see on the street

**comfort :** wind protection  
sun space

**Geneva (XX<sup>th</sup> building).**



**social :** to see on the city

**comfort :** bad weather protection

... but « *beginning closing for extending living* »!

# Balconies in building, contemporary signs

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## Examples of space and function in balconies

### Geneva

(other case study).

Those balconies were closed during the building construction. After 3 years first damages appears (poor envelope material closing balconies)



True loggia in recent building (good envelope material, made for).

### Bellevue – Geneva



Interesting solution : sliding glass panels over balconies easy handling from inhabitant (the space stay affected to outdoor!).



# Balconies conversion in building

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## Final consideration

After many case studies, the conflict between space, function and building it appears to be a frequent problem.

The « classical-technical » approach (moisture, light, acoustic, ...) of the problem doesn't give a complete solution, because in most case the solution is more « architectural ».

The « space-use » must lead us to the intervention and not the contrary.

*Thanks for your attention...*