

## Historic Building in Modena, IT

### PROJECT SUMMARY

Housing renovation  
Energy conservation  
Removal of moisture  
Building service (bioclimatic equipment system integrated)  
Reduction of primary energy:  
81 %

### SPECIAL FEATURES

Solar collectors with vacuum glass pipes

### ARCHITECT

Architect: Stefano Delli  
Engineer: Gambuzzi

### OWNER

VAM SPA, via Leoncavallo, 6/a  
41037 Mirandola (Mo) - Italy



IEA SHC Task 37

Advanced Housing Renovation with Solar & Conservation



Before



### BACKGROUND

*In 2003, thermal bridges caused moisture that damaged the frescoes into the historical residential block building, which the owner VAM SPA solved by a systematic renovation. His main objectives were: 1. A sustainable, energy efficient*

*building*

*3. Removal of moisture*

*The energy planner had few hindrances because the historic building was not free from encumbrance (because it must obey the law 1497/39 that not permit to modify historic building) le and the architect couldn't modify some external brick..*

### SUMMARY OF THE RENOVATION

Insulation of the building envelope: façade (100 mm),basement (100 mm), roof (180 mm)

Improved frames (double pane) and addition of a second frame in certain windows

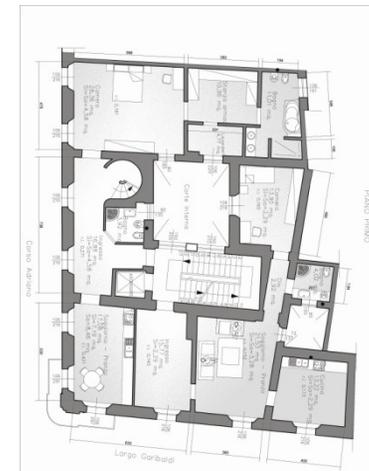
Removal of the superfetation (extension of building that deface the construction) to improve thermal radiation

Installation of heating and cooling panels working with low temperature

Installation of solar collector to produce heating water for household use



Section



Ground floor

After





interior

## CONSTRUCTION

### Roof construction

*U-value: 0.11 W/(m<sup>2</sup>·K)*

Carraro plate GF 25	20 mm
Swampy cane panels	250 mm
Panels of hemp	50 mm
Coconut in coils	50 mm
Fir-flow paralel	30 mm
Wood panel	80 mm
Polyethylene (PE)	2 mm
<b>Total</b>	<b>482 mm</b>

### Wall (north) construction *U-value: 0.26 W/(m<sup>2</sup>·K)*

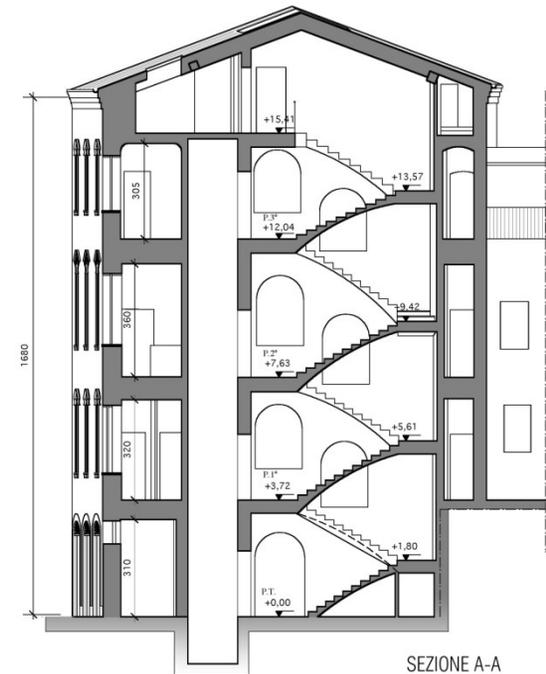
(interior to exterior)

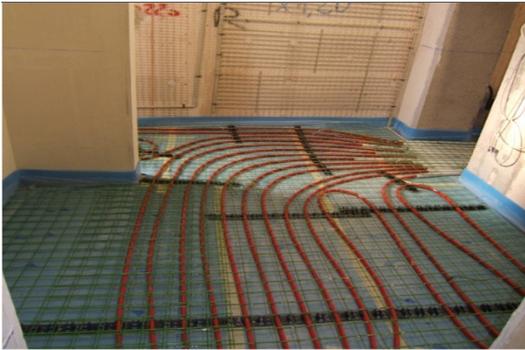
Cocciopesto for plastering	15 mm
Hollow tile	120 mm
Fiber of coconut in slab	40 mm
Corkpan	60 mm
Full brick	450 mm
Calciterm	10 mm
Cocciopesto for plastering	15 mm
<b>Total</b>	<b>710 mm</b>

### Wall (west) construction *U-value: 0.24 W/(m<sup>2</sup>·K)*

(top down)

Cocciopesto for plastering	30 mm
Cocciotherm	40 mm
Hollow tile	80 mm
Corkpan	80 mm
Full brick	300 mm
Cocciotherm	50 mm
Cocciopesto for plastering	15 mm
<b>Total</b>	<b>595 mm</b>





### Summary of U-values $W/(m^2 \cdot K)$

	Before	After
Wall (west)	1.75	0.24
Wall (north)	1.42	0.26
roof	3.07	0.11
Windows*	4.63	1.5

### BUILDING SERVICES

Before renovation: gas-fired boiler standard  
103.5 kW

After renovation: condensation boiler 35 kW

### RENEWABLE ENERGY USE

*Installation 12 m<sup>2</sup> of solar collector to produce water heating for household use (glass vacuum packed on south-south/west facade)*

### ENERGY PERFORMANCE

Space + water heating (primary energy)\*

Before: 367 kWh/m<sup>2</sup>

After: 70.5 kWh/m<sup>2</sup>

Reduction: 81%

\*D.L. 311: 2006 (energy save law in Italy)

### INFORMATION SOURCES

Edilio 30 August 2006,  
BolognaFiereWeb Srl  
Via Maserati 20  
40128 Bologna - Italia  
(Italiano) [www.edilio.it/](http://www.edilio.it/)

### Brochure authors

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