



Doragno Castle - Rovio, Ticino, Switzerland

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Internal Insulation – Mineral wool with vapour
barrier - Solution 2

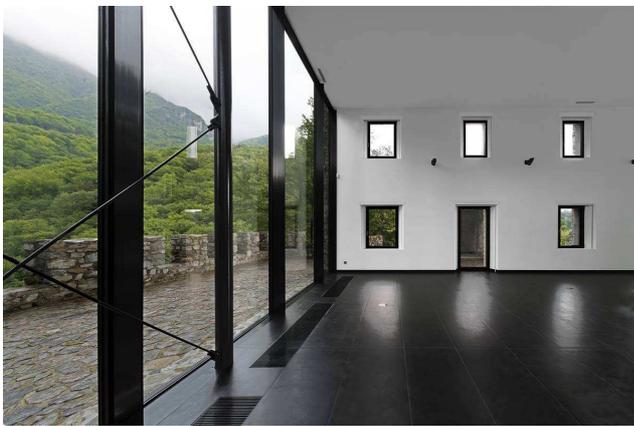
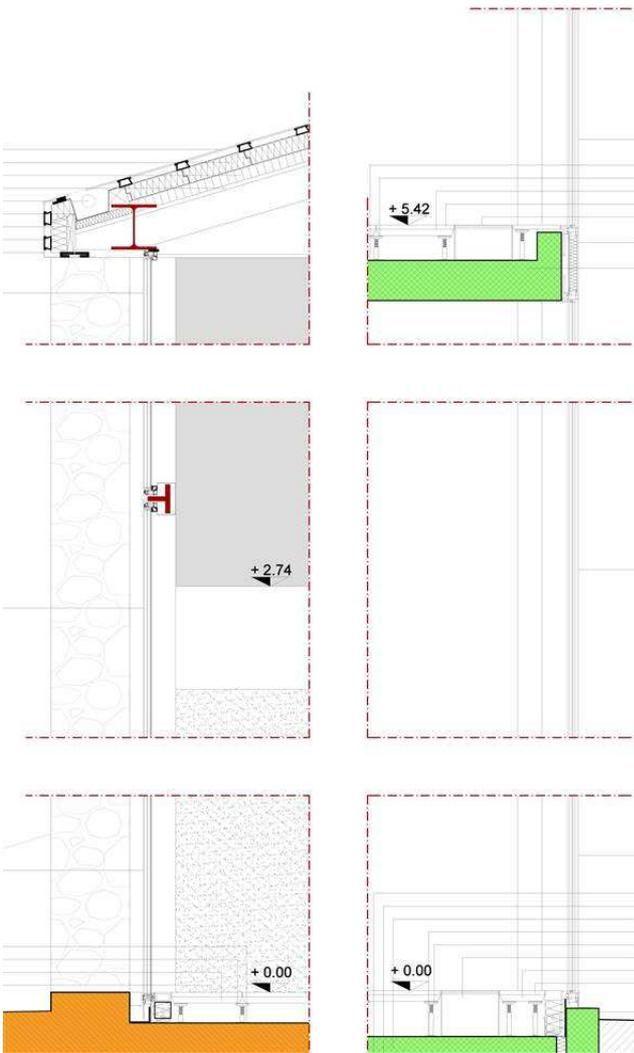
Walls

What is the solution?

The restoration project started from the right premise of completing what remained of the walls of the tower of the ancient Castle of Rovio to return the shape so that in the surrounding landscape the building of the past once again became legible. For this reason and to achieve a high energy efficiency standard the stone walls were insulated from the inside using 100 mm of mineral wool (Rockwool) and two layers of plasterboard. This solution envisages the use of metal profiles for fixing the plasterboard that gives an air gap of 30 mm. A vapour barrier to prevent mold is used together with the mineral wool insulation layer.

Cross section of the wall build-up, available pictures of the solution:

Cross section with Glass © Delta zero



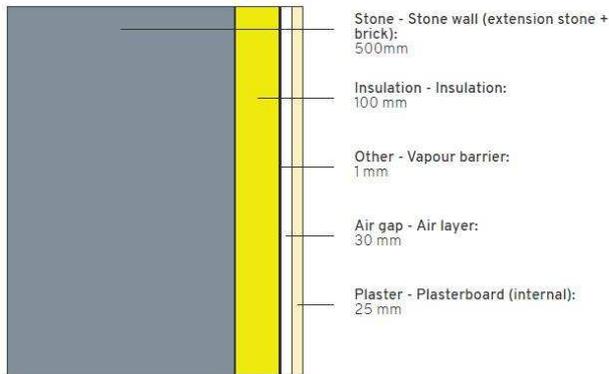
External walls © L. Carugo



Stone external walls © L. Carugo

Retrofitted wall build-up

Retrofitted wall build-up



During works: on the right metal profiles for fixing plasterboard © DeltaZero

Why does the solution work in terms of compatibility with conservation, moisture safety and energy improvement?

The intervention safeguards the external appearance of the building by further enhancing its appearance. From the energy point of view, this solution allows to reach a low transmittance and the choice of vapor permeable materials guarantee a passage of humidity without particular problems.

Description of the context:

The project aims to restore the soul of the castle, by demolishing the works made in the 20th century and using new glazed surfaces. Doragno Castle is now a private residence building, a historic not-listed building in Ticino, that after be renovated achieved a high standard energy efficiency by using also solar energy. In this project the architects have re-created the shape of the castle using modern materials considering today's comfort standards and it was chosen to preserve as much as possible the medieval walls of the ancient building and to preserve only the shell of the original building joining old and modern facilities, with the support of new and innovative technical solutions.

Pros and cons of the solution:

No executive difficulties, no difficulty in selecting materials; the only negative factor with respect to external insulation, as is known, is the impossibility of eliminating thermal bridges at the floors.

Additional Information:

To increase comfort of users and to minimize cost the selection of technical solutions must consider local climate conditions. The climate in this area is classified as Cfb: Temperate oceanic climate (Köppen climate type), characterized by a temperate climate, without dry season, with warm summer. the coldest month averaging above 0 °C (32 °F), all months with average temperatures below 22 °C (71.6 °F), and at least four months averaging above 10 °C (50 °F) with no significant precipitation difference between seasons. This climate characteristics implies that is very important to consider overheating in summer than cold in wintertime. The insulation was placed inside the building to respect the ancient stone walls of the castle even though thermal inertia to stabilize temperatures in summer would have been desirable in this climate. It should also be considered that it is a secondary residence, and the building is not permanently habited.

Is there any related publication? If yes, please provide any available link or document for further reading

https://www.hiberatlas.com/smartedit/projects/28/TuttoCasa_17-05_Intervenire_su_edifici_storici.pdf

Tutto casa

Link to best practice example (Hiberatlas):

<https://www.hiberatlas.com/en/doragno-castle-rovio-ticino-switzerland--2-28.html>