Innovative reflective coating

Author: Eleonora Leonardi (EURAC)

Walls

What is the solution?

A reflective coating can be applied on the surface of an historic wall in order to decrease its cooling energy consumption. This coating has a white colour and it is reversible. The coatings here described are two: 1. a silica film. 2. a water-based solution and/or ethanol solution. This solution was developed within a research project and up to now is not on the market.

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

Reflective Coating on a test wall

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

The reflective coating can be applied through a primer (for example Paraloid primer), which ensures its reversibility. The coating protects the existing plaster and prevents it from cracking because of softening temperature changes. The solution brings an energy improvement through a reduction of surface temperature inside the building and consequently a reduction of

cooling energy and loads.

Description of the context:

The solution was applied on a building in Instanbul, where the durability was tested.

Pros and cons of the solution:

The main advantages of the solution are its reversibility and the really simple installation procedure. The main disadvantages are the white colour and the decrease of solar gains in winter (with the consequent increase of heating demand).

Type of data available (level of information, simulation):

The material is a new material that was developed within a research project. The material was tested in a large scale mock up and in a real building. The monitoring results are published in a research paper.

Additional Information:

The solution shows its best opportunities in two cases: a) hot climates where no heating system is needed and b) warm climates where no cooling system has to be installed (saving on investment).

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

https://www.hiberatlas.com/smartedit/projects/140/paper F. Roberti.pdf
F. Roberti, E. Lucchi, A. Troi, "Effects of radiation reflective coatings applied to massive walls", 31st International PLEA Conference, 9-11 September, Bologna
https://www.hiberatlas.com/smartedit/projects/140/Capture.pdf
Francesca Becherini, Elena Lucchi, Alessandra Gandini, Maria Casado Barrasa, Alexandra Troi, Francesca Roberti, Maria Sachini, Maria Concetta Di Tuccio, Leire Garmendia Arrieta, Luc Pockelé, Adriana Bernardi "Characterization and thermal performance evaluation of infrared reflective coatings compatible with historic buildings", Building and Environment
https://www.hiberatlas.com/smartedit/projects/140/Capture_1.pdf
E. Lucchi, M. Tabak, A. Troi, "The “Cost Optimality” Approach for the Internal Insulation of Historic Buildings", Climamed 2017