

Retrofitting of historical buildings requires multiple expertise

January 30 2014, by Constanze Böttcher

Historical buildings and town quarters are an integral part of the European cultural heritage. However, such buildings are often not very energy efficient and thus contribute substantially to the emission of greenhouse gases. To meet the challenges climate change poses to our living space, experts therefore look for new approaches. Based on eight case studies across Europe, the EU-funded project 3encult aims at finding solutions for an energy efficient retrofitting of historical buildings while at the same time preserving their unique historical value.

Here, project coordinator Alexandra Troi, vice head of the Institute for Renewable Energy of the European Academy of Bolzano, Italy, talks to youris.com about the technological and cultural challenges in the project's interdisciplinary work.

What has been the major development in the field of historic building renovation over the past few years?

A real development, is a new openness on the part of architects and conservators for no longer excluding historic buildings from an energy efficient retrofitting. When the first version of the Energy Performance of Buildings Directive came out in 2002, there was this fear that all old buildings would be disfigured, or ruined. This has now changed to a more constructive approach. People want to preserve the buildings, they want to use them and also to make them more energy efficient. But this has of course to be done in a way that is compatible with the heritage

value of a building.

What does 'compatibility with the heritage value' actually mean?

Compatibility may be simply a question of aesthetics. But it can also be a question of demonstrating an old technology or of keeping the original material. Previously, for example, double-glazing had considerable weight. An old frame could hardly support it. The use of triple glazing would have been nearly impossible too. Now, there is this so-called thin-layer glazing, which has less glass than the standard insulation glazing and might therefore be installed in historical window frames. Such an approach has been applied in the one of the projects' [case study](#) in Bolzano, Italy. It made it possible to use new window frames resembling the aesthetics of the original baroque windows.

Another case study of the project is the Höttinger School in Innsbruck, Austria, which is an example of early modern architecture. The new [ventilation system](#) implemented as part of the project uses the potential of the building. There are huge staircases and corridors. A ventilation system with conventional ducts would have altered the building. We applied a so-called active overflow ventilation system, which has been developed in Switzerland in recent years. Without using pipes, fresh air is transferred from the central corridor into the classrooms by means of an active device that has been installed into the walls.

What else can be done using new technological approaches?

Technology can contribute to improve insulation. Historical buildings are often insulated from inside because the façade is decorated or the original plaster still exists. Capillary active insulation systems, which

avoid the moisture risk at the old interior walls, are therefore further optimised within the project. Moreover, ways to install the insulation in a reversible way are developed. At the public weigh house in Bolzano, we use a clay-based glue that can be dissolved with water.

Where are the limits for an energy-efficient retrofitting of historical buildings?

There will always be buildings where little can be done. I would not try to turn Neuschwanstein Castle into a low-energy building. That would not be a meaningful approach. But for a large proportion of our old town buildings, there will always be a way to improve the energy efficiency. It often helps to look at the previous function of a building. What did the architects have in mind, in terms of ventilation, shading and so on? There are many ways to save energy within a building. You have to look at the entire building and all possibilities to decide which are the best solutions for each building.

What is the major challenge when it comes to implementing a renovation concept for historic buildings?

I think it is important that all actors involved should talk to each other without any prejudices. If the conservator, for example, only looks at the final product to say either yes or no, then it is hard to find a solution. But if the conservator clearly points out the historical value of a building and the technical experts talk to the conservator already at an early stage and if there is continuous feedback, then a solution for a certain building can be found. But this approach is not very widespread yet. My vision is that conservators, engineers and architects learn to talk to each other to find creative, individual solutions for historical buildings.

More information: Video: Restoring historic buildings and saving energy: phys.org/news310293612.html

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