



Less Heating, More Comfort

By Melita Tuschinski

Reunification as an Opportunity for Buildings and the Environment

Do you enjoy the flair of old houses, too? With their high ceilings, large rooms and windows they are increasingly popular among building owners and tenants. When, in the winter of 1979, we visited our friends in Leipzig – in the former German Democratic Republic – we were surprised to find such a beautiful apartment behind the weathered facade dating from the turn of the century. While outside it stormed and the plaster peeled from the walls, inside it was cozy and we enjoyed their company while drinking tea and tasting the delicious cookies. Our hosts had providently carried up enough briquettes from the cellar and none of us were thinking about the heating gases flowing through the chimney and harming the environment.

Oil shock forces to save energy

Were you living in West Germany during the seventies? You might remember the oil crisis and the panic raised. Heating fuel was suddenly scarce and expensive and it became clear how much each family depended on the oil imports. Both German governments reacted to this with new laws on energy saving in buildings.

Heat protection as first step

You surely know this from your own experience: We are very sensitive to the air temperature and easily catch a cold when it is not comfortably warm in our houses during wintertime so we have to heat more and more to keep it comfortably warm inside. Therefore, the first thermal regulation obliged builders to insulate the envelope of new planned buildings and the heating regulation obliged them to install energy efficient heating systems.

Meanwhile in 1979 our friends in Leipzig, East Germany, surprised us with their proven method to lower heating costs: Their bedroom was not heated and an electric blanket was all they needed to keep them warm through the winter nights.

Saving energy in the reunited Germany

While in Western Germany, the federal government had introduced stricter requirements for building insulation over the years, in the reunited Germany building owners had to consider the last Heat Protection Regulation from 1995 and the last Heating System Regulation from 1998. From the first years of the reunited Germany you may read the report of the engineer Rolf Lautenbach, who analyzed a school building and was surprised about what he found out (see box on page 20).

The thermal insulation of a house and its heating system complement each other and should not be considered separately. That's why the first Energy Saving Regulation for buildings (Energieeinsparverordnung EnEV 2002) brought the two schemes together and demanded energy efficient new buildings and renovations. Since October 2009 the newest, stricter EnEV 2009 is in force. If a building is listed as a monument, it is much more complicated, because the heritage authorities and law have the final vote when it comes to renovation.



If you Find a Wall...

“Do not trust your eyes, nor drawings or documents,” concluded Rolf Lautenbach in 1990. The expert for technical building equipment from Cologne had established a new engineering office in Quedlinburg, in the New States of Germany. While examining a school building made of prefabricated panels he was surprised by his discovery. The outer walls were apparently built of sandwich elements with a layer of concrete outside, insulation in between and an inner shell made of concrete. As Lautenbach walked through the rooms along the outer walls, he was amazed that they irradiated heat very differently although their construction was the same. What was the solution to this puzzle?

Only a drilling could help find the answer to this mystery. Lautenbach and his team punctured the “suspiciously cold” walls and brought their inner life to light. The result was surprising: The exterior walls only partly consisted of sandwich elements and also included massive non-isolated structures. What this meant for the heat loss through the outer wall and for the thermal comfort of the students in wintertime, Lautenbach experienced on his own skin. His team measured the temperatures at the inner surface of the outer walls and easily identified the “black sheep” – the non-insulated areas.

A year later, in another Eastern city, Lautenbach met by chance the former manager of the precast concrete factory which had produced the buildings elements for the school walls in Quedlinburg. He was now working as an official in charge and explained the background to Lautenbach: “If the building plan of the school indicates sandwich elements, it does not mean that there actually are sandwich elements built in. For that particular school we had to deliver the building plates, but at that time we lacked the insulation material. Thus, 60 percent of the building elements, although they do look like sandwich plates, consisted only of solid concrete, without any thermal insulation inserted.”

Since that day Rolf Lautenbach followed his practice principle: “Never trust what you see in a building – neither from the inside nor from the outside! Analyze it thoroughly; otherwise you may face a rude awakening!”

Based on a report by Dipl.-Ing. Rolf Lautenbach VDI, Cologne, www.lr-lautenbach.de





Cross border environmental protection

The European Community made the protection of the environment and the energy supply a major priority. Heating gases don't respect national boundaries and thus only transnational efforts of saving energy would protect the environment. To this purpose, the first European Energy Performance of Building Directive (EPBD 2003) obliged the member states to adopt laws and regulations in order to reduce the energy consumption in new and existing buildings. The directive also asked to introduce energy certificate for buildings, in order to help buyers and new tenants to compare the offers on the real estate market. Proprietors of large public service buildings – such as town halls, registry offices and schools – should exhibit their energy certificate so the public could picture the standard of the building.

Milestone and outlook 2010

On July 8, 2010 the revised EU Building Directive came into force. According to its timetable and targets, Germany must update its building regulations, too. Buildings consume 40 percent of the total energy in the EU countries. Therefore the European Union has set the target to increase the energy efficiency of new and existing buildings and the use of renewable energies for heating, hot water and air conditioning. The amended EU Directive 2010 takes into account the external and internal environment of buildings and the cost effective-

ness of building measures. It sets the general framework for a computational method for the energy efficiency and requires the member states to apply minimum standards for the entire building and building parts. EU member states should also introduce the energy certificates for buildings or parts of buildings. Their heating and air conditioning systems should be inspected regularly and the member states have to set up independent control systems for the energy certificates and the inspection reports.

According to the EU goals, the community should be more independent of imported energy. Applying the EU Directive should also help to secure the energy supply in the community and to promote the technological development.



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Houses (old and newly-renovated)
in Mühlhausen; Photos: VEEBA