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Pilot project ‘Holstenkamp’, Hamburg

GERMANY

Summary / conclusion and lessons learnt

From the Conservators point of view:

It was unexpectedly intricate to compare the two variants ‘wall heating’ and ‘convector heating’ because in the regular technical regulations the room air temperature is the only parameter regarding comfort-values. A mixture of comfort, hygiene and effectivity of the wall heating should be the parameters to be examined. Therefore it should be taken into consideration to complement the existing energy-efficiency calculation system with a method which allows to calculate wall heating systems.

An important lesson learnt is that the technology for long term measurements of temperature and humidity of walls, including the equipment as well as the technique to apply the gauges to the walls, is very complex. Only very few highly qualified and experienced institutes exist, which are able to ensure resilient measuring results.
In the planning process one of the major problems was to convince the local public building support bank to give their permission for the special loan for energy efficiency to be used for the wall heating system. This was due to the fact that in the regular calculation

software wall heating and internal insulation were not implemented. Therefore an alternative calculation method, a hygrothermal simulation, had to be used. The costs for this alternative calculations were coverd by Co_2olBricks because they were so high, that a normal house owner would not have been able to cover them. Only by this hygrothermal simulation it was possible to determine the optimal material for the internal insulation and the optimal thickness of its layers in combination with the wall heating and the convector heating systems.

As an outlook for future projects the finding is that due to the low system-temperatures, which are necessary for wall heating systems, interesting options to install low temperature renewable heating-systems, such as heat pumps, geothermal energy or solar systems, come into sight. This is due to the fact that these renewable systems often provide the energy already at the right temperatures for the wall heating systems so that the losses by converting energy can possibly be reduced.

From the architects perspective:

A big challenge was to get all technical energy consultants under one roof, e.g. the research institute for hygrothermal simulation, the expert for noise protection, the energy consultant, the technical facility planner. A very good factor was that this fact was known from the beginning on because back then it was already planned to install a wall heating system and an internal insulation. This meant that the complexity of the project was well known, as well as the fact that more consulting than usual would be necessary. Due to the complexity it took one year to come to a balanced concept where everybody now has the feeling that a technically feasible solution has been found.

The house owners quickly recognized the advantages of a wall heating system and therefore it was no difficulty to find enough units to install it. The heating energy is produced by a combined heat and power unit. The selection process for this unit was a long process during which many possibilities were assessed and eventually a gas fired combined heat production was selected. An already existing boiler room was reused.

For the internal insulation it is necessary that the outer wall is rain proof and it was a difficult process to select the right method. The problem was that it is not clearly definded, neither in the literature nor through the participating research institute, at what point rain proofnes is achieved. So a building physics office had to be commissioned to work out the appropriate solution. The chosen solution was to refurbish the joints.

Legal aspects:

The climate protection plan of Hamburg and the German Energy Saving Directive (ENEV) require certain minimum energy efficiency standards. Although this listed building is exempt from the ENEV, the public authority issuing the building permission was difficult to convince of the concept.

Proposal for future projects:

More investigation about possibilities to achieve a risk free outer wall construction from the point of building physics at the lowest possible effort are necessary. The thorough analysis should next time in any case include the investigation of the rain proofness of the wall because the rainproofness is a precondidtion for the internal insulation. In this respect the difficult planning process was worth every endeavour because now a solution has been found where the architect does not expect any problems anymore .

From the owners perspective:

If there had not been the financial support to cover the extra costs of the wall heating systems, the house owners probably would not have chosen this system. On the other hand more owners would have liked to install the wall heating system but due to limited funding resources the total number of wall heating systems was limited. But now they are satisfied to have two systems so that they can compare them. They are also content that this way they can contribute to the preservation of a listed brick building.

Another problem was that within the buildings which contain several units the individual owners were not always of the same opinion and therefore the majority decided which system (wall heating or conventional convection heating) was to be installed in the house. By this procedure not everybody got the system he preferred. Many users were open to both systems, some even had already personal experiences with surface heating systems. But it has to be stated that all in all not very many field reports about wall heating systems were available to the users. Internal insulation and floor heating was easily understood by most of the users but the wall heating concept was more difficult to understand. So eventually the users had to trust the experts from the architects office, the resarach institute and the conservators.