Abstract

According to governmental directives the energy consumption in Sweden should decrease by 20% by the year 2010 compared to 1995. The building sector is responsible for using about 40% of all energy in Sweden and 60% of that is used in operating costs. Building passive houses is a way of reducing these numbers. The first passive house was built in Germany in 1991, where there are about 8000 passive houses today. The development has been slightly slower in Sweden but it is estimated that there will be about 900 apartments in passive houses by the end of 2009.

Svenska Bostäder is building the first rental apartment buildings with the passive house technique in Stockholm. In the construction a facade with a thin layer of plaster on expanded polystyrene foam (EPS) board will be used, a method that has been widely criticised in the recent years due to repeated moisture damage in these designs. A weak spot has been identified as joints and connections in the facade. In a passive house the walls are thicker than normal due to increased insulation, which puts higher demands on accuracy and detail planning in junctions, such as those for windows. It also creates other conditions for the expression of the facade and will imply further difficulties when placing the windows outermost in the wall.

The purpose of the thesis is to examine the way junctions between walls and window frames in thick walls can be designed in the best manner, with regards to both technical details and aesthetical expression. We have used existing plans as a start and developed proposals and alternatives to the designs, which we have then evaluated on the basis of different perspectives.

Four proposals have been developed to make a more shallow location possible for the windows within the wall. Two of the proposals are based on the fastening of windows using steel plates at right angles that run along the window perimeter. For the other two proposals the windows are fastened to cement bonded fiberboards fixed as a frame in the opening. The proposals have been analysed with regards to strength, moisture, energy transmittance, assembly properties and aesthetics.

We also give advice about how to plan a moisture-safe project as well as establishing a checklist to be used on site to facilitate the assembly and follow-up after completion, in relation to window fixtures.