The Centre for Sustainable Building (ZUB*)

A Case Study

pictures by C. Meyer, 2001

The Centre for Sustainable Building (ZUB*) at the University of Kassel is an example of how new low energy systems and strategies have been implemented in the building process. Energy efficiency with sustainable building. This can only be achieved by having a well-designed integral planning process which considers the whole building and its environment.

Energy efficient building with the lowest possible impact on our natural environment is much more than a demand, it is a need in the entire building process.

The ZUB office building is an example of how new low energy systems and strategies have been implemented. A ventilation strategy: fresh air supply directly to the offices and return air via the atrium. To save electrical energy, both natural lighting and ventilation strategies have been implemented. Solar gains are used through the glazing of the south facing façades.

The office building of the Centre for Sustainable Building is situated at the University of Kassel, in an old urban neighborhood. The new building of the ZUB spans a gap between two examples of old houses. A new, non-intrusive façade, which contains the entrance zone and the classrooms, joins the old brick building of the Faculty of Architecture to the modern concrete construction, joining them to form a combination of old and new.

The ZUB office building consists mainly of three different parts: one part for exhibitions and events, one part for offices and an experimental part for different kinds of research in building technologies. The experimental part provides for the floor/ceiling construction to be replaced and the walls to be changed. The ventilation strategy has been developed for the experimental part.

To save electrical energy, both natural lighting and ventilation strategies have been implemented. Solar gains are used through the glazing of the south facing façades. Solar radiation, which is a major heat source from the building, generates a big thermal effect on the building. This, in turn, affects the indoor comfort and indoor air quality.

Ventilation strategies

To reduce ventilation heat losses, mechanically balanced ventilation with heat recovery has been implemented. In the normal operation mode, fresh air is supplied and exhaust air extracted from the offices.

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The ZUB office building is situated in two especially equipped office rooms. Detailed system studies on components (heating and ventilation system) are being carried out.

Furthermore, the ZUB office building is a demonstration project for the "Low Exergy Systems for Heating and Cooling of Buildings" (Solaroptimiertes Bauen; research programme funded by the German Ministry of Economy and Technology) currently being run. Over a period of four years, all the planning and construction processes are being followed up and, for at least two years, measurements of all important parameters of this building are being drawn out. Approximately 1300 measurement points, such as temperatures and heat and energy flows, are monitored. In addition, the thermal behavior of the office building is being researched by comparing the measured data with the energy simulated by computer models. The building is being used as a test building for the experimental part.

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