

Significance of design parameters for very low energy use and good indoor climate: Simulations and measurements of Danish single family passive houses

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The largest project so far in Denmark testing the performance of passive houses was the “Komforthusene”- project near Vejle. The monitored indoor climate and energy use was published in January 2012 (Larsen et al, 2012) and the results showed poor thermal comfort in many houses. The missing or external solar shading of the windows together with poor possibilities for natural ventilation and therefore also night cooling were seen as the most significant factors. Furthermore, the missing focus in the evaluation and documentation of the expected indoor climate in the design phase was seen as a problem, too.

This actual study takes up the results from “Komforthusene” – project together with new measurements on yet another passive single family house, located north of Copenhagen, which is very representative for typical Danish single family house design, consisting of brick walls and saddle roof. The façade facing south, however, is characterized by large windows that are provided with manually controlled external shading devices. In addition to the mechanical ventilation with heat recovery there is potential for good natural ventilation with roof windows.

The measured indoor temperatures, CO₂ - and relative humidity –levels and energy are compared with dynamic building simulations and simple methods like PHPP and Danish standard energy calculation tool Be10. The focus is on finding the significance of the design parameters – including solar shading and ventilation strategy – on the indoor climate and energy use. In addition, the ability of the different tools to predict the performance of a very low energy house is studied.

The study is a part of a master thesis carried out in spring 2012 at the Technical University of Denmark, DTU.

REFERENCES

Larsen, T S; Jensen, R L., Daniels, O (2012) Komforthusene: Målinger og Analyse af Indeklima og Energiforbrug i 8 Passivhuse 2008-2011. Aalborg Universitet. Institut for Byggeri og Anlæg, 2012. 92 s. (DCE Technical Reports; 126).