



STATIONARY HEAT TRANSFER AND AIRFLOW SIMULATION FOR TEST POLIGON HOUSES

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ABSTRACT

Energy efficiency of houses is highly topical problem nowadays, low energy consumption buildings are being built around the world, and however, the thermal comfort is an issue that must be dealt with. For this purpose the test polygon of five houses with various construction solutions are being built in Riga, Latvia for which the aim is to acquire the best energy efficiency together with thermal comfort.

This work deals with stationary heat transfer and airflow simulations in test houses, the ANSYS/CFX software is used for the study. The modelling approach includes two model types. The first type is a 3D air region with heat transfer coefficient (third type) boundary conditions on outer surfaces to account for structures heat insulation. The second model type is a full 3D model including walls for different building constructions starting from lightweight plywood and rock wool construction and ending with heavyweight clay brick walls. The corner effects are being compared between model types and construction types. The heating is done with air to air heat pump and the room is being ventilated with an opening near the ceiling with a rate of 0.6 volumes of room per hour. The analyses are made for different inflow angles and velocities for both model types. The model setup and meshing are also discussed in a paper and governing equations are given.

Keywords: fluid dynamics, thermal comfort, energy efficiency