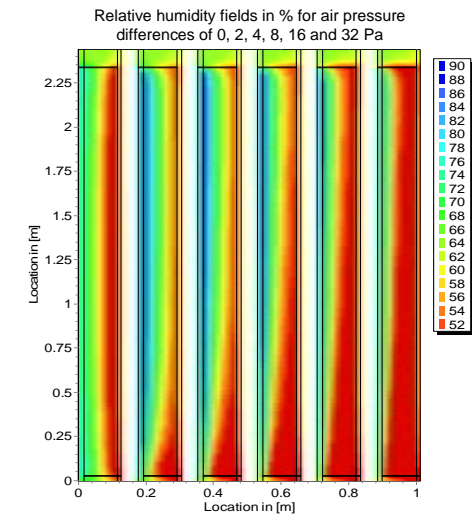
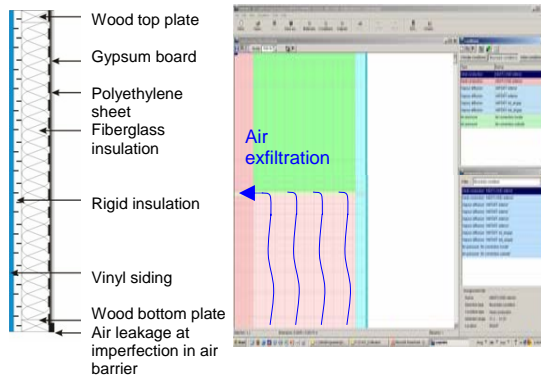
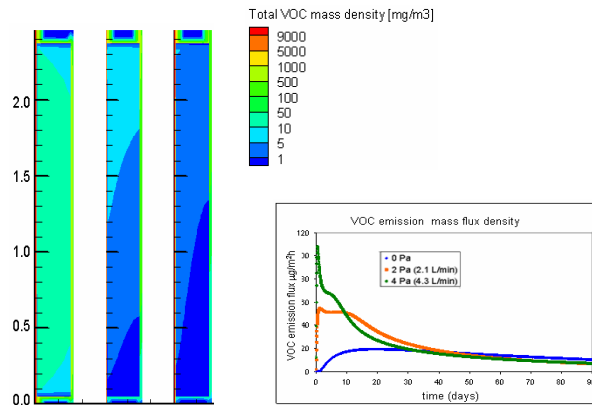
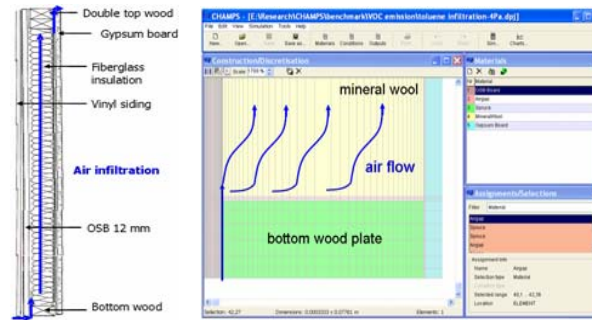


Air flow effects on hygrothermal performance of lightweight wall assemblies



CHAMPS-BES

Infiltration effect on VOC emissions from construction materials



CHAMPS-BES



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Coupled Heat, Air, Moisture and Pollutant Simulation in Building Envelope Systems



by

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CHAMPS-BES is an outcome of a joint effort between

- Building Energy and Environmental Systems Laboratory (BEESL) @ Syracuse University, U.S.A.
- Institute for Building Climatology (IBK) @ University of Technology Dresden (TUD), Germany.

CHAMPS-BES is used for analysis and prediction of

- Hygrothermal performance of building enclosures.
- Impact of outdoor climate and pollution on indoor environment.
- Impact of VOC emissions from building materials and indoor furnishings on indoor air quality.

Research and developmental works included

- A model of gaseous and adsorbed pollutant transport through building envelopes
- A one-way coupled model of airflow effects on the heat, moisture and pollutant transport
- A database of material properties for heat and moisture and for volatile organic compounds
- Efficient solver for integration of ordinary differential equation systems (CVODE, LNLL)
- Small-scale environmental chamber experiments to determine the material properties
- Full-scale experiments using the coupled indoor/outdoor environmental simulator (C-I/O-ES) for model validations.

CHAMPS-BES application areas

Building Climatology

- Preservation of historical buildings and cultural heritage
- Interaction between Building, Climate and Inhabitants

Building Physics & Soil Science

- New materials and processes
- Hygrothermal and hydraulic material properties

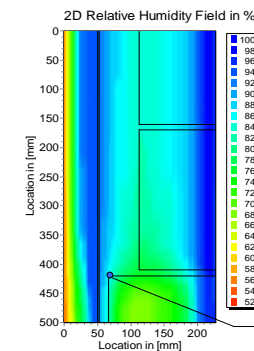
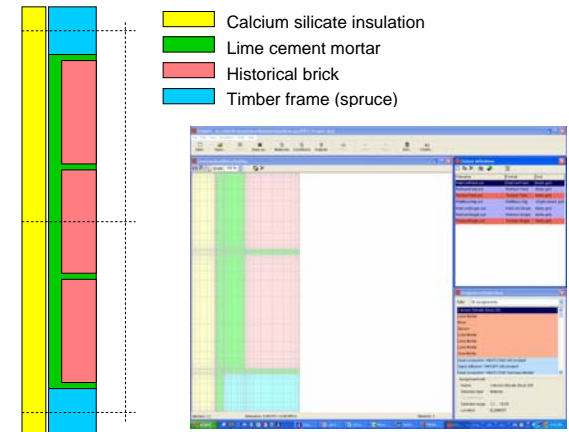
Mechanical & Energy Engineering

- Energy efficiency, sustainable development of built environment
- Mechanical properties, durability, damaging processes

Environmental & Architectural Engineering

- Material emissions and IAQ
- Outdoor to indoor pollutant transport
- Moisture buffering, dampness and mold control

Specially designed building materials in energy-efficient renovation



Insulation panels

