

# THE INFLUENCE OF BUILDING TECHNIQUES ON THE INDOOR CLIMATE

The ventilation requirement for a house is a compromise between the need to keep the indoor relative humidity down and the need to minimise energy consumption.

Trends in building design have been towards complicated, light structures, optimised through the use of computer models but not always performing as expected when released into the care of the occupants. In particular the intricate detailing and the tendency to use non water absorbent materials brings a considerable risk of condensation in the northern European climate, with subsequent mould growth.

The prevalence of mould growth in houses, and our growing recognition, or conviction, that this mould is harmful to health, has led to minimum ventilation requirements for houses. On the other hand our recognition, or conviction, that our energy consumption is altering the world's climate has led to a conflicting requirement that ventilation be reduced. Mould growth in the occupied part of the house is usually a consequence of uneven wall temperature. Mould growth in the hidden parts of the structure is usually a consequence of air leakage from the inhabited part.

The dependence of mould growth on moisture in the air and in materials has been precisely defined in laboratory experiments but these results do not correlate well with observations from real life. The computer models that we use to predict moisture content in hidden building components cannot calculate rapid fluctuations in moisture content of absorbent building materials, because they are based on a diffusion equation that takes no account of chemical adsorption of water on materials. There are some rather fundamental gaps in our knowledge of the dynamics of biological growth. The influence on growth of air flow and air exchange has been neglected.

There is an increasing interest among building physicists in the properties of water absorbent, porous materials, which, combined with permeable membranes to retard vapour flow, promise to allow a measure of dehumidification and air purification by gas movement through the entire wall, rather than through pre-ordained channels such as ducts and windows. These material investigations, together with physiological studies of people's tolerance to draughts and uneven temperature indoors, promise to re-activate the discussion on the use of traditional ventilation through windows as a perfectly reasonable way to control the indoor climate without unreasonable waste of energy.

Source: [http://www.conservationphysics.org/wproj/wproj\\_v9.php](http://www.conservationphysics.org/wproj/wproj_v9.php)