

Indoor Air Quality and Health in New Zealand's traditional Homes

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ABSTRACT: Sustainable design consists of principles and practices of architecture that protect environmental quality and human health, reducing environmental impacts resulting from construction activities. Considering that in New Zealand approximately 15% of the adult population and 20% of children under the age of 15 are affected by asthma, the ongoing attempt to introduce sustainable principles in New Zealand's architecture appears questionable, as Indoor Air Quality (IAQ) and the related aspect of health have been poorly considered so far. A major step towards sustainability will be the retrofitting of the existing building stock, in order to meet new energy efficiency standards while providing a healthier indoor environment by reducing the risk of allergies and asthma.

Allergies in New Zealand have become a serious health problem with considerable social and economic impact. Especially the indoor environment of residential buildings plays a major role in the increasing numbers of allergies and airways infections. Many new and renovated homes have been designed and built with low quality insulation and heating systems, and a lack of adequate ventilation. Furthermore, the energy performance upgrade of the existing building stock, ongoing since 1978, has changed the buildings' physical behaviour, generating new and unexpected problems. Badly constructed houses are difficult and expensive to heat: the consequent inadequate thermal comfort in homes, associated with poor ventilation, leads to growth of moulds, with health consequences.

This paper examines the indoor air pollution in relation to construction details, insulation level, ventilation and humidity. It also addresses moisture damages caused by damp housing. The specific influence of poor IAQ on health in general and possible risks of developing allergies in particular is identified. The lack of information about IAQ in New Zealand's buildings is addressed by discussing preventative actions, advice how problems can be proactively avoided and practical recommendation for the refurbishment of specific building typologies. As in New Zealand practice there are currently no methods available to simulate the process of moisture transport within building components in relation to the indoor climate, a calculative assessment of thermal and hygric processes in the external wall assemble is introduced by using the simplified Glaser Method and the computer programme WUFI (Wärme und Feuchte instationär). That allows producing realistic calculations of the transient heat and moisture transport in building components under natural conditions.

Conference theme: Sustainability issues

Keywords: indoor air quality; health; damp housing; moisture control.