NP1004 METHODS TO ACHIEVE THERMAL COMFORT IN TOP FLOOR OF MULTI-LEVEL DETACHED DWELLINGS WHICH COMPLY WITH CURRENT AUSTRALIAN THERMAL REGULATION CODES

Research Question

How "thermal comfort" can be provided by a passive or hybrid system in the upper level of multi-level detached dwellings in Australia particularly in summer?

This question could bring up another question:

How much the lack of thermal comfort in upper floors of dwellings impact residents' lives?

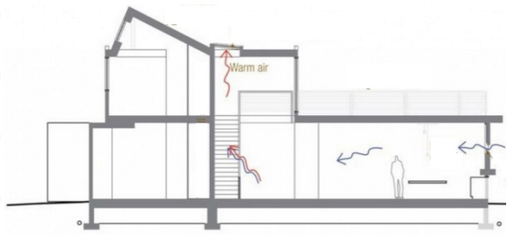

Figure1: Models for thermal comfort

Methodology

A combination of quantitative (interval, ratio) and qualitative (nominal, ordinal) methods is the approach of this proposal. Integrating the outcomes of these two methods together is a challenging part which will lead to actual result. The study will follow below process:

. Data collection and preparation

. Data analysis and synthesises

. Suggesting solutions to the problem

. Evaluating solution and choosing the best

Results

Thermal comfort is a condition of mind which includes:

5 measurable and tangible factors: Air Velocity, Metabolism, Clothes, Humidity and Temperature

4 incomputable factors: Beliefs, Values, Expectations and Aspirations

There are models and formulas for first part which makes a graphical or numerical relation between items such as Psychrometric chart. Although the second section is descriptive, there are models which can conclude those factors too, such as Adaptive thermal comfort or Predicted Mean Vote and Predicted Percentage of Dissatisfaction.

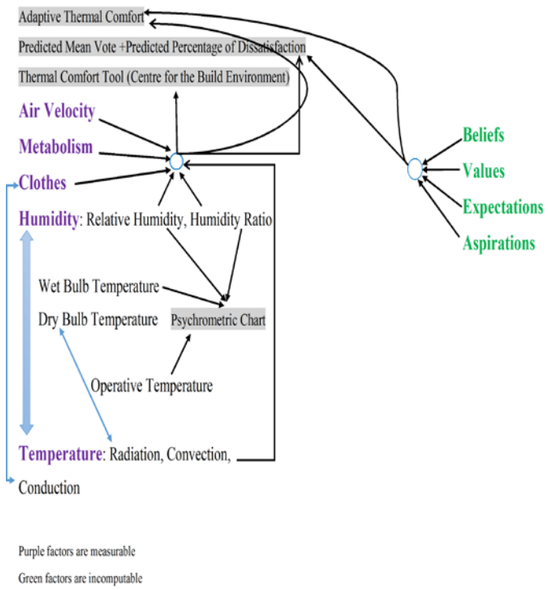

Figure: Models for thermal comfort

Thermal comfort is not achieved even in regulated buildings. An investigation in Lochiel Park shows that:

40% of households mentioned their home were less comfortable than expected during heatwaves.

92% households expressed that the upstairs areas are uncomfortable in heatwaves.

There is a significant need to uniform thermal environment that satisfies the majority of occupants in all parts of a home.

Conclusions

Providing thermal comfort in upstairs area is focused on air quality, but will reduce energy usage specifically in peak energy demands. Because it is the uncomfortable zone that changes to critical zone due to weather events. Meanwhile the residential housing sector air conditioning produce 7.6% of Australia's greenhouse gas emissions and is largely responsible for escalating peak electrical power demand.

Figure: Providing thermal comfort cuts the peak energy demands.

Anticipated impacts

. Examining the impact of passive/active intervention on thermal comfort of upstairs areas in dwellings

. Introducing new methods/guidelines to industry at least in a national context

. Recommendations for updating some items in relevant software and codes

Meanwhile providing thermal comfort will:

. Rises the quality of life, health and productivity

. Reduces usage of energy (by cutting the peaks) and greenhouse gas emission

Key statement

Thermal comfort is a matter of:

Quality of Air, so ➔ Quality of Physical+ Mental Health, so➔Quality of Life

Thermal comfort raises the quality of life which people spend lots of energy, time and money for providing it.

Contact

Sormeh Sharifi

University of South Australia

Sormeh.sharifi@unisa.edu.au