Building a Better New Zealand 2014 Conference
Academic Paper Submission

Themes: Achieving Better Buildings
Performance of the building envelope * Internal Environments * Resilient buildings * Managing moisture, thermal efficiency and air quality

DESIGNING FOR RESILIENCE: iDEAL HOUSE AUCKLAND

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Abstract:

The iDEAL house is a private family home, located in suburban Auckland and due for completion in May 2014. The design brief asked for a highly energy efficient and net zero energy home within a modest budget, whilst maintaining a high level of indoor environmental quality. Outstanding thermal performance of the building envelope was essential to achieving the aspirations of this brief.

In order to safeguard the performance targets, the project underwent Passive House Certification (pending until construction is completed). It was furthermore design rated using the Homestar Tool, to provide a benchmark measure for wider sustainability issues.
A far more detailed analysis was undertaken than would normally occur for a family home. Interstitial condensation, mould and structural decay issues were particular concerns that were evaluated and addressed. This paper will discuss the results of this analysis, and the hygrothermal performance of the building envelope that can subsequently be expected.

Results were obtained using the following analytic tools:

- Integrated Environmental Solutions <Virtual Environment> (IES <VE>) thermal analysis of the building envelope to establish specific heat energy demand;
- Passive House Project Planner (PHPP) for Passive House Certification, to ensure compliance with the Passive House performance targets;
- Wärme und Feuchte instationär (WUFI®) for calculation of the transient coupled heat and moisture transport in multi-layer building components exposed to natural indoor and outdoor environment.
- Psi-Therm for the calculation of thermal bridging coefficients to limit the additional hat loss, as well as assessing resulting interior surface temperatures, to prevent discomfort and surface condensation throughout the building.

Measures and construction details that were identified to meet the performance targets are presented, also with regard to their fit with the requirements of the New Zealand Building Code, and the budget constraints of the project.
The paper will demonstrate that an aspirational brief can be answered with limited additional cost when proper design strategies are employed.

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