DESIGN RIGHT

Designing better

Significant performance improvements can be achieved affordably in houses by designing above the New Zealand Building Code minimum requirements. So, where is a good place to start to improve the liveability of a house?

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PERFORMANCE requirements set by the New Zealand Building Code are considered comparatively low by international standards.

Going above Code

With many homes currently being designed and built to simply meet the minimum requirements of the Building Code, many opportunities exist to design homes that have much-improved performance. These improvements simply need to be considered at the design stage. While they can add to the cost of the home, many add very little as a proportion of the total cost and will provide significant benefits over the life of the building.

Let's consider some options for going above Building Code within clauses E3 *Internal moisture*, G4 *Ventilation* and H1 *Energy efficiency*. These three clauses relate directly to the important aspect of the health and liveability of a home's indoor environment.

E3 Internal moisture

E3.2, a functional requirement for E3, states that 'Buildings must be constructed to avoid the likelihood of:

(a) Fungal growth or the accumulation of contaminants on linings and other *building elements*; and
(b) Free water overflow penetrating to an adjoining *household unit*; and
(c) Damage to *building elements* being caused by the presence of moisture.'

In most cases, the occurrence of (a) and (c) relates to high levels of internal moisture within a home's indoor environment combined with excessive thermal bridging. Internal moisture generally results in condensation when the warm moisture-laden air meets a cold surface. This can contribute to fungal growth and long-term damage to building elements – particularly wall and ceiling linings and finishes. It also creates an unhealthy indoor environment, with poor indoor air quality having the potential to negatively impact occupants health.

To avoid the potential for this, a home requires a combination of good thermal performance, well-managed internal temperature (particularly during colder months) and effective ventilation.

Simply meeting Code minimum requirements with insulation and ventilation does not guarantee a healthy indoor environment. We often need to go above Code.

Higher-performance homes are insulated well above Code, are very airtight and have effective supplementary heating and ventilation, which means there are unlikely to be any issues with excessive internal moisture and condensation.

Consideration should be given to extent and orientation of glazing, as well as shading to ensure homes don't overheat during warm months.

Insulation

Insulating the building envelope to levels beyond Code means that the home will be more thermally efficient, maintain a higher and more consistent temperature during cold months for less cost and, if solar gains are managed, keep cooler during warm months.

Higher R-value insulation combined with more thermally efficient exterior joinery and reducing excess framing improves the efficiency of the thermal envelope.

Airtightness

Construction methods and materials used in new homes mean they are generally more airtight than older stock. Air infiltration and exfiltration is reduced, resulting in much lower levels of heat loss.

Various methods of improving airtightness exist. Incorporating a smart vapour retarder behind the interior linings, the use of rigid air