WINTER COMFORT

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Thermal mass beats winter chill

Greg Fleming talks to designer Niel de Jong about building homes which are designed to keep themselves warm in winter and cool in summer.

Our attitudes to our homes and how we build them is changing says Niel de Jong, CEO of Ebode Homes, one of New Zealand's leading sustainable architecture practices.

"There's a lot of people seriously looking at the way we have been living and they're realising now that building efficiently and environmentally is the only way to go. Because if you're not building like that for the future you're actually building something that's not going to be worth anything in a little while — it will end up costing you and will be hard to sell as well. When it becomes the norm to build responsibly people are not going to want the other houses."

His advice for those building a home is to cast their mind back to building basics — harness the heat from the sun and store it in some kind of thermal mass like stone, rammed earth or other material which is thick enough to heat up slowly, hold that heat and slow-release it during the night hours.

"One of the issues we have with our New Zealand homes, because of the way we construct them, predominantly with timber frames, is that you end up with these great fluctuations between day-time and night-time temperatures,'' says Niel. "One of the reasons that New Zealand houses often feel cold and uncomfortable, is because of the heat fluctuations that can happen between night-time and day-time. In fact the weather we're having at the moment, where you have very cold snaps with periodic rain and cloud cover, a lot of our New Zealand homes perform very poorly in that situation. If you've got something with a very good thermal mass floor or other thermal mass elements it will moderate the temperature, collecting some of that heat and hold it, taking some of the heat spikes out at the hot end and moderating the cold spikes at the bottom end. If you design a house like that in conjunction with really good insulation, then you actually don't need to add a lot of extra heat into the house in order to achieve a really comfortable environment."

EBODE's Niel de Jong

The placement of the house on the section, how it is orientated towards the sun and how the family uses the house are all important considerations.

"When we design we do it with good shading — in winter you design so the shading doesn't work and in summer it does, so the house is kept cool. The angle that you get the roof at is critical."

> 'With the advances in glazing, houses today can be truly passive solar so that you're directly heating the living spaces.'

Isn't this "thermal mass" idea just a throwback to the way they built houses thousands of years ago?

"Well, yes it is, but the difference is that a lot of that thermal mass way of building that was happening in Europe and colder climates added an external heat source because the sun wasn't always enough to do it. Whereas a modern thermal mass home is relying on the sun, so it's about good passive solar, and you need a combination of good thermal massing in the house and large glazed areas to let the sun in. One of the problems historically was that they had a good thermal mass house and the way they heated it then was with a fireplace central to the house and with a big thermal mass chimney around it and that was burning all the time and keeping that thermal mass warmed. That helped to moderate the temperature of the whole place inside and because there wasn't the technology to make really large panes of glass, nor was there double glazing technology, and there was a disadvantage in making the window openings too big. Some of the courtyard houses back then were designed to let the sun in in the winter and shade in the summer and they would have a thermal mass tiled courtyard which when you opened all the doors, that courtyard was actually quite warm, it would hold that heat right through the evening. There was that way of doing it where they weren't relying on it being behind glass."

But today in order to capture the sun's heat windows are key, lots of them.

"With the advances in glazing houses today can be truly passive solar,'' says Niel, "so that you're directly heating the living spaces. It's a little bit of a balancing act, because one of the things with glass is it's a very poor insulator and lets heat out, which is why double glazing is an important part of a good passive solar design."

For extra heating Niel recommends the Pyroclassic, a wood burner which is New Zealand made and very energy efficient and meets the stringent emissions standards operating in Christchurch. It can be installed with a wet-back which is great for boosting a solar hot water system.

Renovating villas and bungalows

Niel has also had plenty of experience renovating older villas and bungalows as director of design at the Heritage Design Group.

"When we do this sort of work we look at the way people are living in the houses and we might re-orient the living spaces accordingly. A lot of the Californian bungalows here are still on the same floor plan. Many are very poorly sited, often these are the ones that have the laundry/toilet on the north side, and all of the living either on the east or the south, rooms which are not really benefiting from having those spaces warm during the day."

His advice to those wanting to renovate a villa themselves is to insulate. He recommends using a wool insulation material like eco-fleece. It is more environmentally friendly and still insulates if it gets damp, unlike fibreglass equivalents.

"In a villa I would insulate the ceiling first and then I would do the floor. Villas often have floors where the timbers have shrunk and gaps have started to appear. They're often built on a reasonably ventilated pile foundation system, so there's quite a bit of air-flow under the floor. Air flow's good and a house needs it to keep healthy so don't be tempted to block off the the sub-floor. You should fit insulation blocks or bats and fit this up between the floor joists. This creates a wind barrier and insulates it at floor level but still allows air-flow between your flooring timbers to keep them all dry. In a newer house I'd go roof then wall, and definitely put batts anywhere you have the gib-board on. Also it is important to insulate internal walls. This decreases the transfer of sound through the walls and helps decreases the transfer of heat from one side of the house to the other and has a big impact on moderating temperature change in a house."

HOME COMFORT: Plenty of double-glazed windows coupled with the right design are the keys to a good passive solar home. PIC COURTESY EBODE HOMES