

## TRIED AND TESTED

Earth buildings have fallen out of favour in New Zealand, but for sheer durability they can't be beaten.

By Helen Twose

When rammed-earth home builder Paul Geraets is asked to describe the ancient construction technique he compares it to making a sand castle.

"We get a form; we get the soil and we compact it into that form and then strip the formwork immediately and the wall is up and standing," says the managing director of Terra Firma Earth Building Company.

Unlike a sandcastle tapped out of a plastic bucket, walls constructed from compacted sandy soils mixed with a bit of cement can withstand the elements for hundreds – if not thousands – of years.

Once the wall has cured and fully hardened it becomes the equivalent of man-made sedimentary rock, he says.

Examples of rammed-earth homes dating back several thousand years can be found in Iran, says Geraets, with monuments like the Great Wall of China constructed using the technique.

Here in New Zealand Roman Catholic missionaries drew on their experience of earth construction in France, where roughly 15 per cent of houses are earth-based, to build Northland's Pompallier House in the 1840s.

But the rise of manufactured, component-based building in the 19<sup>th</sup> and 20<sup>th</sup> century has seen rammed-earth fall from favour, only to regain popularity in the last 30 years.

Geraets has been a rammed-earth home enthusiast since investigating sustainable, long-lasting, low-cost housing more than 20 years ago led him to the traditional technique.

"The only thing that seriously makes a house affordable is its ability to be durable, its ability to last," he says.

He was also keen to turn away from the shoddy and unhealthy building practices he'd experienced as a builder in Melbourne in the early 80s.

Inspired by *Rammed Earth Experience*, a book by Californian specialist David Easton, Geraets built his own home overlooking Raglan's Whale Bay.

Drawing on his background in the construction industry and introducing innovative building techniques he was able to erect 60 tonne of earth walls in just 17 days.

Since then Geraets reckons Terra Firma Earth Building Company has built around 80 homes in the Waikato and Auckland region, saying he has created the designs himself for 50 of those.

Geraets, a licensed building practitioner for design, is assisted on the technical side by a licenced building practitioner for construction and a structural engineer.

Built on conventional concrete foundations with vertical steel beams providing reinforcing, the thick earth walls are completed with wooden internal walls and capped with a timber-framed roof.

The resulting low-maintenance structure with its sandstone coloured walls is not only beautiful to look at but provides a stable indoor temperature with its high thermal mass regulating outdoor temperature fluctuations.

Homes built to Terra Firma Earth Building Company designs, which include timber joinery, solid timber kitchens, wool insulation, bio-paints, but no MDF or polyurethane, cost between \$2200 and \$2400 a square metre, says Geraets.

"If you're building in the right place you can use the soil under your house."

More often than not New Zealand's "mish-mash" of soil



types, including clay-laden volcanic soils sees Geraets using off-site sources of the preferred sandy soils.

He has identified soil with the right properties in the Mangawhai area that can be used for house builds in the Auckland region.

Earth-rammed homes can be built in a similar time-frame to other custom-built houses, says Geraets, adding that Terra Firma doesn't aim to compete with the off-the-shelf designs of building companies.

"We do things the old way."



One of Paul Geraets (pictured) earliest rammed-earth structures was put to the water test during the winter of 2012 when a torrent of water flowed through a home he'd designed and built outside Cambridge 20 years earlier. The one-in-one-hundred year flood was a case of "unstoppable force meeting the immovable object," he says.

The only sign of damage to the house was a fine layer of silt dust on the exterior walls that dusted off when brushed.

