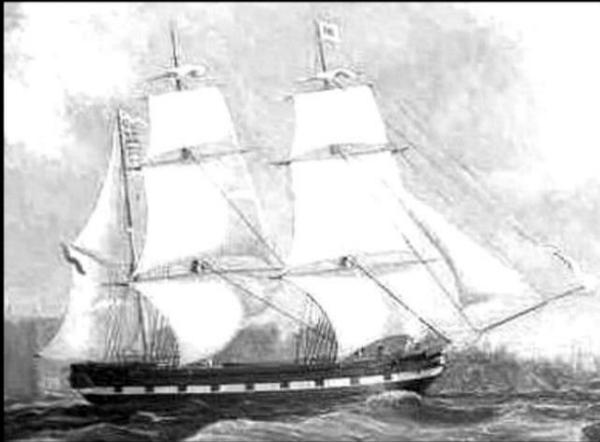


# kiwi ingenuity



There have been some amazing building methods engaged throughout New Zealand in its short history – generations of intuitive home makers utilising a selection of available materials from mud to straw bales, stone, brick, cob, concrete and more. Take a look at a few of these materials and techniques:

## *Mudbricks*

Many early settlers to New Zealand built their new houses in earth – mainly for functional reasons, the materials being cheap (or free), readily available and easy to use without skilled labour. There are a number of examples throughout NZ of earth structures which are still standing almost 150 years later, showing the resilience and longevity of the materials.

Mudbrick (also known as adobe) is one of the easiest and oldest forms of earth building, dating back 900 years or more in areas like North America. Pre-formed bricks were created out of earth, grass, straw and stones, blended together with water, cast in open moulds on the ground and left to dry in the sun and air. A similar mixture would have formed the mortar between the bricks. One of the best preserved examples in NZ is a small building just outside Ashburton, built around 1860 as a boundary rider or stock minder's home.



## *Cob*

Cob is an earth building technique that offers more sculptural results than mudbrick and was widespread throughout NZ, especially in the South Island. It was usually made out of straw or chopped tussock mixed with clay and manure. The mixture forms 'cobs' (lumps), which are thrown on to the wall in a number of layers, then rendered to give a smooth surface. The walls are usually formed thicker at the bottom and can be easily curved or shaped in any way.

A large number of cob structures still exist around New Zealand, many, like this one in Hororata, are owned and maintained by Historic Societies, however some are still occupied. Burkes Pass in the Mackenzie District is noted for being home to a rare group of 5 intact cob cottages all in the same vicinity, most of them still occupied.

## Concrete

The oldest known use of concrete is a floor slab constructed of a red lime, sand and gravel mix which was discovered in Yugoslavia (as then known) and believed to date back to 5600BC. Although considerably more recent, early concrete structures form an important part of New Zealand's cultural heritage. Records show that casks of artificial cement were imported from England as early as 1843, and numerous concrete structures were built here between 1840 and 1900. Concrete was found to be a robust structural material when compared to steel or timber; it required less skilled labour than building with stone or brick and it proved more durable and cost effective.

The oldest concrete dwelling in NZ is a two-storey poured concrete house near Mosgiel, built in 1862 by John Gow, an early settler and farmer. Even by international standards, this structure was remarkable for its age and construction materials. It is still occupied today and is registered as a Category 1 structure by Heritage New Zealand. Many public buildings were also built of concrete in the early days due to it being considered a more sturdy material. The Church, pictured right, is St John's Anglican Church in Barrhill Village, Mid Canterbury. It was built in 1877 and is constructed of 12 inch thick concrete walls and solid concrete floor. It was built by Scotsman John Cathcart Wason who attempted to recreate a model British village at Barrhill, with the main buildings in the village all constructed of concrete.



## Stone

Historically Māori used stone to build paths and walls, but their buildings were constructed of wood and other natural materials. These were also the logical choices of the early settlers with earth and timber being readily available in most parts of New Zealand.

Comparatively few stone buildings were therefore constructed in NZ, for reasons such as cost, lack of skilled workforce and its unreliability during earthquakes. Those built were often churches, public buildings, and houses of wealthy British settlers in the cities. Originally any stone buildings were of rubble construction, where various shaped blocks were fitted together and infilled with mortar; but a more 'dressed' style of stone was gradually preferred. A local vernacular also evolved from the type of stone available e.g. limestone construction in Ōamaru, and schist in Central Otago. As time has progressed,

stone became more widely used as a feature rather than the main structural component, forming pillars or facings around windows and doors.

The photo to the right shows Hakatere Stone Cottage in Mid Canterbury, built in 1862 as married quarters for the Mt Possession shepherd and constructed of squared greywacke filled with a clay mix. This building, registered as a Category 2 historic place with Heritage New Zealand, is now empty and is owned and conserved by the Department of Conservation.

## Timber

Timber has been New Zealand's consistently reliable building material of choice. The early settlers brought with them the knowledge and desire for stone and brick construction but the reality of an earthquake prone country quickly encouraged them to appreciate the values of timber – light to transport, easy and quick to construct and flexible in seismic activities.



Government House, Wellington, built in 1908-10

Throughout the 19th century New Zealand had to provide a large number of buildings to support a rapidly growing population, and this needed to happen



quickly and cheaply. Timber was the main method of construction at this time, increasing from 79% of houses built in 1858 to 90% in 1911. The traditional NZ villa, left, is one of this country's most distinctive housing types and predominated housing design from the 1870s through to WW1, being originally fairly simple in form but gaining more decorative features as time, and affluence, progressed. It became the favoured design for new houses in the first suburbs in the colonial towns and villages in the 1880s as urban populations dramatically increased – with over 85,000 being built throughout the country.



The versatility of timber construction is one reason for its longevity of use. It can be used for building types ranging from wooden shacks, like the basic Chinatown buildings to the right, through to grand Edwardian structures such as Government House in Wellington, top, which features jarrah weatherboard cladding with plastered infills.



## *Brick*

The first known bricks in New Zealand were imported from Australia circa 1806, as part of a small prefab house (Australian brickworks had been operating since 1788). The first NZ made bricks were thought to be fired at the Kerikeri Mission in 1819, by a Maori who had learned the trade in Sydney. The early bricks were hand-made and fired in clamp kilns: a stack of bricks with firewood between the brick layers. As towns developed, kilns were constructed and eventually most districts had their own local kiln – it is evident from the location of old brick houses today that they were more prevalent close to the location of a brickworks.

With NZ seismic activity in mind, brick-veneer construction quickly developed which comprised an internal timber frame with a brick exterior. Earthquake requirements of the New Zealand Building Regulations changed after the 1931 Napier quake, precluding the use of brick as a structural element, so all brickwork had to be supported by another element such as timber or steel framing. Following that, the most common use of brick in houses was in chimneys. Many examples of brick construction exist in all parts of the country today, although the older brick properties are concentrated more in the central and lower South Island as brick construction was very familiar to the Scots who made up the majority of the early settlers to those areas. The photo shows the Church of the Holy Name, a vast brick structure in the heart of Ashburton.

## *Straw Bale*

Historically this building method was used most widely in North America, especially areas like Nebraska where the soils were unsuitable for earth building. There are two techniques – either the straw walls can carry the weight of the roof or, more commonly, there is a timber load bearing frame with straw infill panels for insulation. This was a popular building material in some areas as straw is cheap, easily available, renewable and has a high insulation value and a straw bale house could be built by unskilled workers.

The construction is simple - bales of straw are stacked like bricks to form a wall, wired together and then plastered with lime or earth-based plaster. The most important aspect of the construction is that the straw cannot get wet – the bales sit on a concrete slab to prevent moisture seeping up from the ground and if they do get wet they are susceptible to rot. There are only a relatively small number of straw bale homes in New Zealand but the popularity has increased over the past decade with people becoming more environmentally minded. There are a number of NZ straw bale companies now offering construction services or workshops for those wanting to self-build.

