

# On the block

The development of hollow-core concrete blocks offered faster, cheaper building and homes that were built to last. New Zealand was quick to make use of the new technology.

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The invention of Portland cement in 1832 opened the way to pre-cast concrete blocks. In the 1830s, a variety of machines for making concrete blocks were patented in England and the US. However, the blocks had a disadvantage – weight. A solid block measuring 12 × 9 × 32 inches (30 × 23 × 81 cm) could weigh 180 pounds (82 kg) and require a hand-crane for placement. Builders and inventors were looking for a more convenient, lighter block.

In 1889, Harmon S Palmer, of Chattanooga, Tennessee, patented a machine to make a solid concrete block. In 1899, he patented a ‘machine for moulding hollow concrete building blocks’ that, together with his 1901 patent for a ‘concrete wall for buildings’, was the start of modern concrete blocks.

The object of Palmer’s block was to ‘simplify, cheapen, and to produce stronger buildings as well as more efficient in protecting from the elements’. The cavity created ‘a thin wall of stone... to receive the rain... that a few hours of sunshine will remove all dampness, leaving the walls dry and the building in a sanitary and healthy condition’. The cavities could also be used ‘as a ventilator, which can be connected with every room in the house, thereby securing a circulation of air of the most desirable kind’.

Palmer designed a range of blocks, including a corner block with a long side (full block length) and a short side (half block length), see Figure 1. He continued to develop his blocks, including a range of face designs, internal

handgrips and waterproofed cavities. By 1906, there were reportedly 1,000 companies and individuals in the US making hollow concrete blocks and around 100 companies competing with Palmer by 1907.

## New Zealand builds in concrete block

It took only a few years for Palmer’s machine to reach New Zealand. In June 1904, Niels Nielsen, of Wellington, was promoting hollow concrete blocks for buildings that were ‘draught-proof, damp-proof, well-ventilated, and to last hundreds of years.’

In 1904, Nielsen’s Wellington Hollow Concrete Building Block Company built part of Ahradson and Son’s Furniture Warehouse at 30 Tory Street and ‘completed houses’ near its factory in Lyall Bay. A 2-bedroom seaside cottage, built with two bonds of rock-faced block alternating with one of plain block, is still there.

Also standing is a substantial 5-bedroom house built above Oriental Bay, using rock-faced corner blocks with plain block for the internal and external walls (see Figure 2). The interior walls, finished inside the house but left bare in the service building, were also hollow block with supporting maze foundations. Fourteen inch (35 cm) blocks were used on the lower storey and 9 inch (23 cm) on the top storey. This house, certainly among the earliest, if not the earliest, hollow concrete block houses in New Zealand, set the scene for the use of fair-faced concrete construction in the 1950s.

A company was formed and a prospectus issued, claiming ‘the cost of erection is about 15–20% cheaper than brick and only 5% dearer than wood’ as well as benefiting from a saving of 60–70% in fire insurance premiums over wood. At a selling price of 2s 3d per block (equivalent to \$18 in 2011), they expected to sell 82,500 blocks a year.

## Hollow concrete blocks used everywhere

Hollow concrete blocks were being used in other parts of New Zealand as well. By 1906, Mr Frank Palliser – a Timaru builder – had imported a Palmer’s machine, the local Timaru Borough Council had modified their building bylaw to permit the use of hollow concrete block and Mr Palliser had presented a drinking fountain for Caroline Bay. Just 6 years later, in 1912, Timaru was promoting itself as exporting ‘sunny-tempered people and hollow concrete building blocks, but retains large numbers of both for its own use’. By 1910, concrete blocks were being made in Whangarei, Invercargill, Westport, Cambridge and Napier.

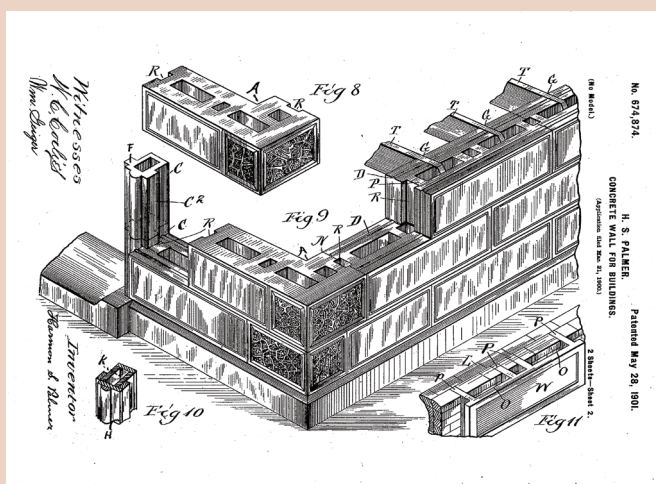


Figure 1: Drawing from Harmon S Palmer’s US Patent 674,874 Concrete wall for buildings (1901).

In 1919, the cement manufacturers of New Zealand published *Concrete information: a practical handbook for all classes of concrete users*, offering guidance for the use of concrete in a wide range of structures, including paths, fence posts, motor houses, stables, piggeries, steps, troughs and sheep dips. Figure 3 shows a garage 'entirely built of concrete', using concrete for the walls and floor with only the roof reinforced with ½ inch (12 mm) steel at 6 inch (150 mm) spacing. It is unclear whether the garage was in New Zealand or whether the blocks are solid or hollow, but the stone-like exterior can be seen.

### Hollow block use declines

Apart from some World War II buildings, hollow concrete blocks did not seem to be widely used from the 1920s to the early 1950s, possibly due to stucco on a timber frame appearing as durable as solid concrete.

### ... and rises again

The modern use of concrete blocks appears to have started in Christchurch in the early 1950s. In 1951, the Christchurch-based Universal Block Company commenced operations with a single English Trianco block-making machine. The company changed its name to Vibrapac Blocks Ltd in 1952 and was taken over by Winstone Ltd in 1973.

In the North Island, Firth Industries purchased Pyramid Concrete Ltd of Hamilton in 1950 and its first concrete block-making machine. By the middle of the decade, the Rotorua factory had two additional Italian machines, and in the late 1950s, US-made Columbia machines were used in Firth's Hamilton, Hastings and Rotorua factories.

Winstone commenced the manufacture of 'Hollowstone' concrete blocks in Three Kings, Auckland, in 1953, using a Besser Vibrapac machine. The steam-cured blocks could be made at a rate of 5,600 blocks per 8-hour day – reportedly enough for four houses. As well as houses, the blocks were for use in commercial buildings in place of standard reinforced concrete.

The growth in the use of concrete blocks led to the founding of the New Zealand Concrete Masonry Association (NZCMA) in 1956. Since 1983, concrete masonry unit manufacture has been harmonised – most recently in AS/NZS 4455.1 *Masonry units, pavers, flags and segmental retaining wall units – masonry units* and, since 1986, there has been a standard for smaller masonry buildings – most recently, NZS 4229:1999: *Concrete masonry buildings not requiring specific engineering design*. ◀



Figure 2: Rock-faced corners with fair-faced hollow concrete block walls in a 1904 Wellington house.



Figure 3: Concrete block garage circa 1919.