

Wall linings

A building's exterior offers a passing view to the world, but it is the interior that provides the backdrop to everyday life. Wall linings have changed over time, but the ever faithful plaster has had a long run and is still going strong.

By Nigel Isaacs, BRANZ Principal Scientist

In early buildings, exterior surfaces could be rough and unfinished, but interiors needed to at least have surfaces that could be kept clean and exclude undesirable vermin, winds and water. In very early houses, smoke from the open fire gave the interior of thatching – whether of palm fronds, raupo or toetoe reeds – a rich dark colour and also served as a fungicide, insecticide and preservative. Eventually, chimneys and controllable ventilation better managed the fire and removed the smoke, providing improved indoor air quality.

Mud, then plaster

Early timber construction offered a framework that could be left unlined, lined or filled with a range of different materials, including mud by itself or plastered over a framework of interlaced branches ('wattle and daub'). The outside could be plastered or covered with a suitable water resistant cover such as reeds or timber planks. The inside was left rough

and unfinished, or smoothed and plastered.

'Lath and plaster' offered the opportunity for a finer finish to be achieved on the walls, but more importantly for the ceiling. The lath – a horizontal strip of timber – was cut from wood that was relatively soft but did not warp. Nailed to the underside of the upper floor, ceiling joists or the wall studs, the timber laths were covered with up to three layers of plaster, providing a smooth, durable and fire resistant surface.

Boards get tighter

Rough sawn boards could be used outside as weatherboarding or inside as board lining. Horizontally fixed, these would be wider and thinner than the exterior cladding. Balloon or platform wood-framing allowed the wind to freely ventilate the cavity. Unfortunately, even if the boards had started life tightly edge-buttet, as they dried out, draughts became an unwelcome addition to family life. Planed, tongued and grooved (PT&G) boards

provided a tighter finish, reducing draughts and limiting the entrance of vermin, so were more often found in kitchens.

Plasterboard arrives

Plastered walls offered many benefits to the homeowner, but it was not until 1894 that Augustine Sackett, a New York engineer, invented plasterboard – a layer of plaster of Paris sandwiched between two layers of cardboard or paper.

Plaster of Paris (named after the large gypsum deposits in Paris) was formed by heating natural gypsum rock and grinding it to a fine powder that, when mixed with water, was able to be shaped, soon setting to a hard, brittle solid. Until the mid-19th century, the plaster was ground by the labour intensive (and gruelling) method of repeatedly striking it with iron-clad clubs. Even with such labour intensive manufacture, plaster of Paris was of great building value, particularly as cities became larger. Following the 1666 Great Fire of London, French King Louis XIV issued a decree that the timber frames of houses had to be covered with nailed boards and plaster, 'both inside and out, in such a way that they are able to withstand fire'.

Plaster of Paris had many other uses, ranging from holding broken bones while they set, to creating precast decorative features for ceilings and cornices.

New Zealand makes plasterboard

By 1917, plasterboard was being produced in Great Britain, although it took until 1946 for it to arrive in France. In New Zealand, plasterboard was initially imported from North America, but local manufacture began in 1925 with the establishment in Auckland of Builder's Composite Materials Ltd, which produced a handmade plasterboard.



Workers in 1927 hand cutting wallboards to untrimmed lengths at the NZ Wallboards factory and preparing to load them into a tunnel drier. (Courtesy of Fletcher Challenge Archives, Ref. 6021P/2.)

The company changed its name in 1927 to NZ Wallboards Ltd and obtained a site in Balmoral Road, Mt Eden. Automated machinery was introduced in 1931, along with the use of pumice in place of the previously used sawdust. A Lower Hutt, Wellington, factory was opened in 1946 (now closed) and a Christchurch factory in 1961. The Balmoral Road factory expanded considerably over the years and was retired in 1971 and replaced by a Penrose plant.

Softboard and hardboard

Timber also provided a resource for the manufacture of a range of wallboards. The local manufacture of softboard, and its sibling hardboard, traces back to the need to use the central North Island's great *Pinus radiata* forests. By the mid-1930s, the commercial opportunities to use the depression era plantings were being explored.

In the late 1930s, a trial shipment of logs from Atiamuri was sent to Sweden to

be processed into insulating wallboard. There was already a demand for such a product, but hardboard was less well known. The Swedish production was too slow, so a further American trial was undertaken. The trade difficulties with Europe as a result of World War II, and a desire to make both softboard and hardboard, led to the selection of an American plant. Placing the plant was the next problem – it could be located near to either the timber, the fuel or the market. In the end, a Penrose, Auckland, location was chosen, and in 1941, New Zealand Forest Products opened its first wallboard factory. The plant continued to produce a range of wallboards until its closure in October 2007. The machinery has been sold and will be used to produce softboard in India.

Although softboard was robust, withstanding impact and knocks, and offered insulation and acoustic benefits, its fire performance



was not good. The Royal Commission into New Zealand's worst fire disaster at the Christchurch store of J. Ballantyne & Co on 18 November 1947 included 'the inflammable nature of much of the stock and soft fibre board used throughout the building' as one of the special circumstances contributing to the rapid spread of the fire. Today, softboard can be factory treated with a flame retardant to minimise the spread of fire. Softboard is still a useful building material and is found in many buildings, whether as a lining or a pin-board to hold notices and favourite photos. ■