

Over 20 tonnes of Cocoon was used on salt affected masonry at St Mary's Cathedral.

TOTALLY COCOONED AUSTRALIAN-MADE POULTICE

Salt contamination has always been a concern in stone restoration and conservation work.

While provision has been made in modern buildings to prevent this happening, with the insertion of a damp-proof course and barriers in the form of a flashing over potential moisture entry points, in most historic buildings damp-proof courses were not used. Subsequently, in a great number of historic properties, moisture has risen to a height where the internal walls and decorations are affected.

Along with residual salt contamination, lateral or falling damp from leaking gutters and down pipes, roof leaks or badly maintained paintwork or pointing, also causes damage by activating either air borne salts, or salts that are present or have been added into the building fabric, with resulting damage similar to that caused by rising damp.

Traditional treatments include sacrificial renders, which have been used in Australia for more than 25 years and are the most commonly used method of preventing degradation of buildings suffering from salt contamination. They work by altering the point of water evaporation where the expansion of the salt takes place so the render eats away rather than the face of the stone or brick, hence the name 'sacrificial'.

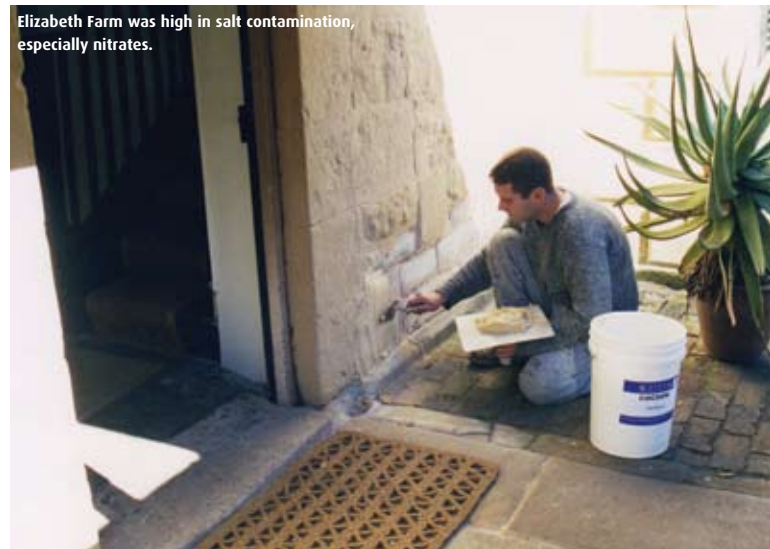
Provided the render is maintained, and replaced if the substrate fabric becomes exposed, deterioration to the main fabric of a building can be prevented. However, if maintenance is not carried out, especially in areas of high salt contamination, the render may be eaten back to the substrate, often within a couple of weeks. Other areas of concern are staining of the brick or stone surface with lime. Also, the render that is eating away needs to be caught in order to prevent it from lying at the bottom of the damp wall where the moisture converts the salts back into a solution and recycles them into the wall.

Another tried and tested form of desalination includes poultices. Several products based on various clays or paper pulp have been tried in Europe and Australia with mixed results. Some products tend to dry very quickly, then shrink and crack losing contact with the wall in a short time – often well before the transfer of salt, activated by the water component, is complete.



Removal of the Cocoon poultice reveals vast improvements.

Elizabeth Farm was high in salt contamination, especially nitrates.





Desalination of the farm's basement wall was carried out in 2002.

Cocoon is a new generation desalination system that is having dramatic results. Developed by Sydney-based Australian company Westox, with salts analysis conducted by CSIRO, this paper poultice is manufactured from pharmaceutical-grade filter paper and is able to remove salts associated with both rising and lateral damp in a short space of time.

"Being involved in desalination techniques for over 25 years, we knew that a material was required that answered the shortcomings of the materials currently being used," said Westox managing director, Barrie Cooper.

"We turned towards filter pad technology used for liquid/solids separation. The finest filters are used in filtering medical products such as insulin and are made by attaching diatomaceous earth to cellulose fibres to remove solids down to point three of one micron. To maintain the flow rates, more diatomaceous earth is used so the internal surface of the finished product is very high and can hold up to seven times its own weight in water. This is the material we choose for Cocoon. The filter is made in the normal manner and then passed through the

manufacturing process again to revert the high-wet-strength material back into a pulp without stripping the diatomaceous earth from the fibres. The pulp is then used to make a soft, easily dispersible board," Barrie explained.

HISTORIC BUILDINGS GIVEN NEW LIFE

Cocoon has been used with great success on numerous historic buildings, including the Duomo in Pisa, Italy, St Mary's Cathedral in Sydney – both buildings were being eroded by nitrate salts; the Duomo from decomposing bodies in an adjacent cemetery and St Mary's from contamination in the soil from the original use of the land as the 'old rum hospital' tip where the northern end of the building was erected – and on Fort Denison.

Being built on a small island in the middle of Sydney Harbour, the sandstone walls of the fort are regularly drenched with salty water. During storms, the water washes over the roof of the building and the spray from the ferries and large boats also contribute to its general battering.

In some areas, the salts, which are predominantly chlorides because of the sea location, were as thick as the icing on a wedding cake.

A test area was set up on one wall and samples taken for analysis at two locations. At each location samples were taken at the 0 to 10 mm, 10 to 20 mm and 20 to 40 mm depths. Four sets of samples were taken over a 26-day period; the cocoon material was not removed or replaced during this time except for a small 5 cm square piece taken from over the drill site at the time the stone samples were taken. This small section was replaced after each test.

"The results after the 26 days showed that Cocoon had reduced the salt contamination in the wall by some 52 per cent at the lower location

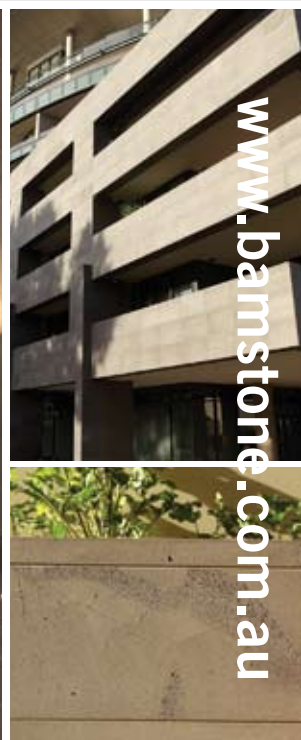
BAMSTONE

it stands the test of time

Bamstone sawn bluestone tested R13 - Slip Resistance AS/NZS 4586:2004 (tests conducted by CSIRO)



Southern Cross Railway Station, Melbourne



www.bamstone.com.au



producers of bluestone, granite & sandstone

Hamilton Rd, Port Fairy VIC 3284 Australia Phone: **(03) 5568 2655** Mobile: **0419 522 709**

Fax: (03) 5568 2454 Email: mark@bamstone.com.au Web: www.bamstone.com.au





The Cocoon poultice helps peel away years of salt damage.

and by 87 per cent at the higher location. By this time, the Cocoon poultice was by weight, 24 per cent salt," revealed Barrie.

"In Australian conditions, we have found that removal of the Cocoon after approximately four days removes a high percentage of nitrates. Cocoon is then re-applied in two applications for two weeks each, to reduce the remaining salt contamination. On the other hand, high sulphate contamination tends to be more difficult to remove and three applications are sometimes necessary," Barrie said.

One of the most successful applications to date has been at Australia's oldest European-style building, Elizabeth Farm, which was built in 1793 from Sydney sandstone.

The building was comparatively high in salt contamination, especially nitrates. Sacrificial renders have been used for some years along with traditional lime washes, and while these have helped slow the rate of decay, success has been limited.

In November 2002 Cocoon was used on a wall in the basement, which was below ground level and lime washed along with the other basement walls after the desalination work, the outside wall of the servants' quarters, which was also lime washed after desalination, and internal and external laundry walls, which had two types of sacrificial renders applied after the desalination work with a lime wash applied over the top.

All existing sacrificial render was removed prior to applying Cocoon so the original stone surface was exposed for desalination. In the areas that were originally lime washed, the stone was mostly exposed by the on-going exfoliation caused by the salt contamination.

Five year later, in February 2007, an inspection of the areas where desalination was carried out revealed only one small area of visible salt contamination in the laundry area where the sacrificial render was used, and another on the outside wall of the servants' quarters where the lime wash was used.

All other areas, including the basement, had no visible signs of salt action. Even the flagstones on the verandas, which were deteriorating at a rapid rate, showed no signs of exfoliation after the Cocoon treatment.

"In theory, if it took 210 years for the salt contamination to reach the stage it was at, if all the salt was removed, it should take another 210 years to reach the same level," said Barrie.

"Of course, it would not be allowed to reach the same level when preventing further deterioration is as simple as two more applications of Cocoon as and when any areas of exfoliation become visible," he added. ☺



Calacutta



Emperador



Navona Satinria



Blue Pearl

Real Quality Marble & Granite

Quality Marble & Granite supply first class
Granite, Limestone, Marble, Travertine and Onyx slab materials
to discernng specifiers, processors and resellers of stone.

To choose materials for your next project visit:

Quality Marble & Granite Warehouse

101 Carrington St Revesby NSW 2212

Ph/Fax: 02 9792 4413 Mobile: 0412 346 592

Email: jhoulford@optusnet.com.au or visit:

www.qualitymarbleandgranite.com.au

background stone: *Fossil Brown*