



BRAND NEW WALLS FOR AN ANCIENT CITY

THE OLD WALLS SURROUNDING FLORENCE HAVE BEEN RENOVATED AND RESTORED WITH CAREFUL ATTENTION AND METICULOUS CARE.

Repairing the city walls in an art city with such a great history as Florence was a long and elaborate enterprise. After almost a year's work the complex restoration operation on the seventy-five metres of wall dating back to the 14th century and stretching from Torrino di Verzaia to San Frediano Gate was finally completed in 2005. San Frediano Gate was built in 1334, possibly designed by the famous Italian architect and sculptor Andrea Pisano (1270-1349), and it still has some of its old studded battens, iron rings and a lily (the symbol of Florence) at the top of the entrance arch. This marble lily was also restored to its ancient splendour by the renovation work.

The walls, or what was left of them centuries later, were part of the last ring of walls around the city. Historians believe they were built in two separate stages: the first during the siege by Henry VII in 1312 and the second a few years later around 1325.

The restoration work was not easy, bearing in mind the monumental walls' state of deterioration. It mainly involved reinforcing the existing structure, particularly on the merlons where the oldest mortar was crumbling, as was also the

case with the stone rows on the external sides; the stones also had to be carefully cleaned and their surfaces strengthened to prevent flaking.

Working with the same old method used by the architects of the time, the walls were constructed out of a combination of stones, gravel and sandy mortar from the Arno and Mugnone, two rivers in the Florence area, in order to create a sort of dry wall. The containment wall was then made of rows of even-shaped ashlar.

Before carrying out the work, laboratory analyses were performed on samples taken from the old walls, so that plenty of information was available about the original stone walling constructed in the first quarter of the 14th century.

The wall mostly feature a kind of masonry made of solid stone and hewn or squared "alberese" stone set in horizontal and parallel rows, frequently doubled. The stones are generally medium- or large-sized with joints and beds of average thickness with no fillers. The original binder was a whitish, extremely fine, crumbly and quite adhering mortar, mixed with aggregates of less than 3 mm.

There is also a different kind of masonry made of solid stone and "alberese" stone, hewn or squared and placed in horizontal and parallel rows, quite similar to the above-mentioned one but mostly including medium-size stones. It was used to build the old merlons, which had a central slit at the base.

The analyses also involved the system for stitching together the walls' sections. It turned out to be based on blocks connecting double rows or, near the highest rows of blocks, on the binding of an element from one row to the adjacent double row. Vertically, it features a graded pattern.

*Photo 1
(previous page).
Two pictures of the old
Florence walls after
renovation, which
restored them to their
ancient beauty. The
work was carried out
on the section of walls
between Porta San
Frediano and the
Torrino di Verzaia.*

*Photo 2.
During the initial work
phase, the wall joints
to be repaired were
first carefully cleaned
using a high-pressure
water washer.*

*Photo 3.
The joints between the
stones have been "re-
grouted" using
Mape-Antique MC
mortar.*

*Photo 4.
Detail of the walls
after completing the
work.*





Mapei's Contribution

Nowadays this section of the old Florence city walls forms a sort of boundary round the city centre. The repair work was carried out on the part of the wall located in the San Frediano neighbourhood, named after its main gateway and allegedly the city district where real Florentines are born.

This is the smallest part of the old city centre of Florence, because the surrounding hills and River Arno have naturally compressed this neighbourhood down through the ages.

For visitors to San Frediano it looks like a maze of small, narrow streets lined with simple houses in contrast to the large squares, churches and imposing palaces just a little further down the river.

The entire area, including the walls, is safeguarded by the Florence City Council's Monument and Fine Arts Commission.

The aim of the conservation project, which involved the use of Mapei products on another section of the walls a few years earlier, was to restore the section of wall from Porta San Frediano to Torrino di Verzaia to its ancient splendour. The first stage of work involved carefully cleaning and preparing the substrates, followed by repairing the pointing between the mixed stones forming the wall structure, originally built using traditional lime-based systems. Years earlier partial repair work had been carried out using traditional materials, but at the time the client was not satisfied with the results, particularly with the colour of the mortar. So this time the management of the Technical Service Department of the Florence City Council's Fine Arts and Monuments Commission decided to get in touch with the Mapei Technical Service Department, which, as well as analysing the construction, also tested out and sampled some products from the MAPE-ANTIQUE range of hydraulic binders and dehumidifying mortars, specially formulated for the restoration of old walls, including those of great historical importance.

These products are cement-free, highly resistant to salts, highly transpirant and feature physical and mechanical properties similar to those of traditional mortars.

At first the colour of the recommended mortar, MAPE-ANTIQUE MC* with specially selected oxides added, did not meet the client's requirements. But the great advantages this kind of mortar offers, plus the fact that, as time went by, it would inevitably darken in colour, finally persuaded the client to adopt the solution proposed by Mapei.

MAPE-ANTIQUE MC* is a pre-packed cement-free mortar composed of hydraulic binders with pozzolanic action, special additives, natural sand and synthetic fibres. When mixed with water it forms a sulphate-resistant, plastic-thixotropic consistency coat which rain water cannot penetrate much, but which, at the same

time, is extremely permeable to vapour, so that rising damp from the foundations can be gradually disposed of.

Thanks to micro-holes, the coat resulting from the application of MAPE-ANTIQUE MC* can counteract any tension caused by the crystallizing of salts carried along by the rising water. Work began by carefully cleaning the joints using mechanical means like a high-pressure water washer; next, all the joints were "re-grouted" using MAPE-ANTIQUE MC*. As the mortar hardened, it was brushed so that its largest inert components could be nicely glimpsed, adding a rustic touch to the structure.

After completing the operations, careful high-pressure washing was performed to "hide" the synthetic fibres present in the MAPE-ANTIQUE MC* and any remaining mortar residue was also washed off the stones.

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***Mapei Product:** the product referred to in this article belongs to the "Building Speciality Line". The technical data sheet is available on the "Mapei Global Infonet" CD/DVD or at the web site: www.mapei.com.

Mape-Antique MC: pre-packed, cement-free, light coloured dehumidifying mortar for the restoration of damp stone, brick and tuff masonry.



TECHNICAL DATA

Old City Walls, Florence (Italy)

Work: renovation of the old walls along the section between Porta San Frediano and Torrino di Verzaia

Years: 2004-2005

Client: Technical Service Department of the Florence City Council's Monuments and Fine Arts Commission

Project: Claudio Cestelli (architect); assistants: Lucia Mugnaini (architect), Pietro Di Tore (surveyor); Claudio Trimarco (designer)

Co-ordinator of Design and Construction Safety: Maresco Messini (architect)

Site Management: Stefano Sancilio (surveyor)

Works Management for the Technical Service Department of Monuments and Fine Arts

Commission: Claudio Cestelli (architect)

Operating Management: Lucia Mugnaini (architect)

Site Inspector: Pietro Di Tore (surveyor)

Head of the Site: Leonardo Mugelli, Mugelli Costruzioni

Contractor: Mugelli Costruzioni, Florence

Sub-contractors: Colaci Ponteggi, Barberino nel Mugello (Florence); Edildomus Tre, Campi Bisenzio (Florence)

Mapei Distributor: Paolo Bigazzi & C., Florence

Mapei Co-ordinator: Davide Bandera and Massimo Lombardi, Mapei SpA