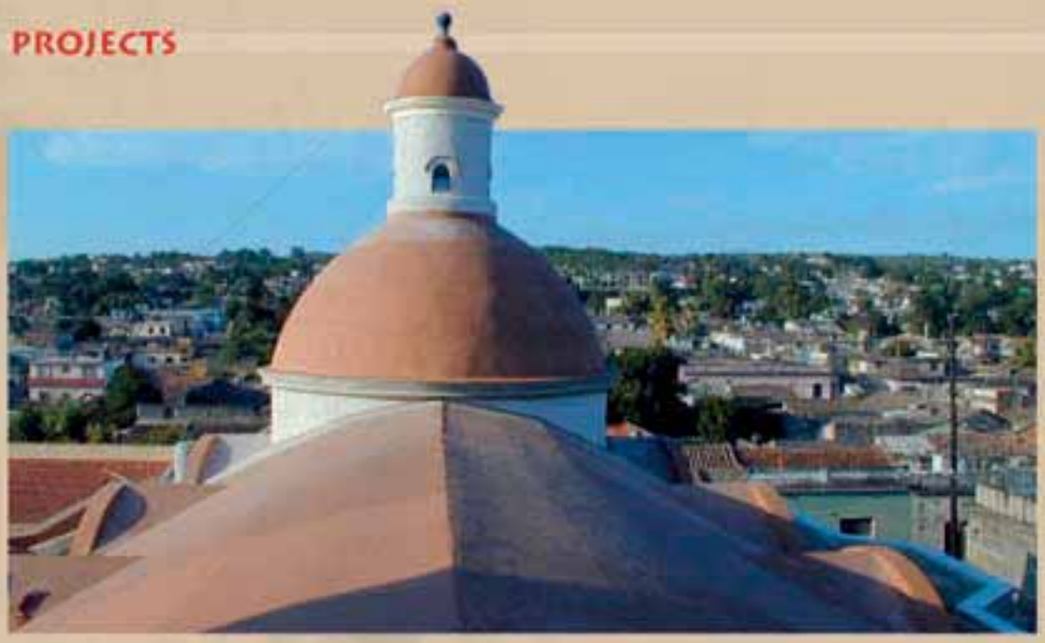

THE RENOVATION OF AN ANCIENT CHURCH IN CUBA WITH A DISTINCTIVE RED ROOF.

Red roofs across the Cuban skyline

The history of San Pedro Apóstol Church in Versalles began in March 1860 when La Habana's Board of Statistics informed the church authorities that Versalles had 380 houses and 2750 inhabitants and was now in need of its own church.

Versalles is a neighbourhood of Matanzas, one of the twenty boroughs forming the Cuban province of the same name. On 22nd of August that year the bishop issued a decree to build a parish church to be named after (and dedicated to) San Pedro Apóstolo in Versalles. He also commissioned the Italian architect Daniele Dall'Aglio to design it and follow all the construction work.

In 1867 the architect showed the bishop the building plans and an estimate of the costs involved in constructing the church. On 14th May 1870, Don Antonio María Pereira, archdeacon of La Habana Cathedral, consecrated the church and placed the Holy Sacrament in it.

Mr. Dall' Aglio designed the church like a temple with three wide aisles, embellishing the central aisle with a "canon-barrel" vault; there is a small dome over the transept. Although the two side towers framing the main façade are not particularly streamlined, they are perfectly proportioned and designed in a gradually ascending sculptural manner, whose totally smooth lower section is followed by a central section decorated with squares and ovals before culminating in small columns and addorsed pediments, which, in turn, act as a base for the pyramid-shaped roof.

Many scholars of Cuban architecture agree that San Pedro Apóstol in Versalles Church is, from a construction viewpoint, one of the nation's most important religious monuments and a fine example of Hispanic colonial architecture.

Mapei's Work

A few years ago the Franciscan monks from the Friar Minor Conventual Order (who are currently looking after the church) decided, bearing in mind its poor state of repair, to undertake renovation and restoration work, both inside and

Photos 1, 2 and 3. Pictures of the church before the renovation; from left: the outside of the building, a detail of the dome and of one of the two towers.

Photos 4, 5 and 6. The dome was initially treated using the Mape-Antique dehumidifying system, then its was waterproofed with red Mapelastic. In the case of the roof, it was decided to reinforce the Mapelastic with Fibreglass Mesh inserted between the two layers of the elastic membrane.


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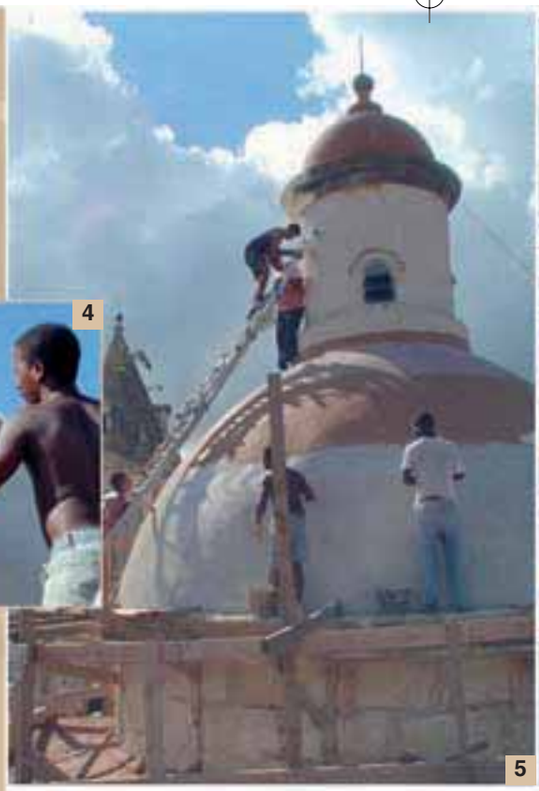
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Photo 7.
The Mape-Antique system was used to restore the main façade to its former glory and protect it against damp.

Photo 8.
The two towers were structurally reinforced using injections of Eporip, Epojet and Mape-Antique I. The damaged parts were then rebuilt and then, lastly, the roofs were waterproofed using red Mapelastic, reinforced between the two layers by means of a Fibreglass Mesh.

outside the building.
Due to technical and financial problems, this turned out to be a rather tricky enterprise, so the monks decided to turn to Mapei Technical Service for help. After a careful examination, which revealed the overall state of disrepair of the entire construction, the technicians and monks decided to carry out the repairs in stages, starting with the dome and roof before working on the main façade and towers, interiors and side facades and completing the operation with modernisation and restructuring work on the communal quarters used by the monks.

Dome and Roof
The dome was in a terrible state with coating material flaking off everywhere, caused by water seeping into the church down the years. First of all the damaged or flaking material was removed; then the surface of the dome was cleaned so that the substrate could be treated with products from the Mape-Antique System.
To begin with, an approximately 5 mm coat of MAPE-ANTIQUE RINZAFFO* "salt-resistant" mortar was applied, ideal for restoring old buildings made of old stone, tuff and brick. Next a 1-3 cm coat of light-coloured MAPE-ANTIQUE MC* dehumidifying mortar was spread all over the dome to give it a more even surface.
The work was completed by using light-coloured MAPE-ANTIQUE FC* fine mortar based on special hydraulic binders, special additives and fine grains of natural sands. The protecting and waterproofing of the dome was completed by applying two coats of red MAPELASTIC* (in a shade specially designed in the same colour as the roofs on Cuban buildings and manufactured by the Mapei plant in Latina, Italy).
MAPELASTIC* is a cementitious mortar producing highly flexible protective-waterproofed membranes. The dome was given the finishing touch of a coat of SILEXCOLOR PAINT*, chosen in the closest shade of red to the original colour. As well as decorating and protecting the surfaces against atmospheric agents, the paint work also keeps the surfaces completely vapour-permeable.


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Like the dome, the main roof was also in a terrible state of repair; the damage to certain parts of the protective surface had actually caused cracks and spits to open up, allowing damp to seep into the perimeter walls and aisle below. After thoroughly cleaning the roof surface, a layer of red MAPELASTIC* was applied.
To enhance MAPELASTIC*'s already high-performance properties, FIBREGLASS MESH* was applied over the first coat while it was still wet. This is a common procedure for surfaces with notable cracks coming under considerable strain as in this case. The mesh was then covered with another coat of red MAPELASTIC*.

Towers and Main Facade
The lack of upkeep, together with maintenance problems, down the years had allowed shrubs to grow all over the side towers and the plants' roots had made them unstable.
This meant that work had to be carried out on the structure of these two constructions before working on their surfaces. This was achieved by making several injections of MAPE-ANTIQUE I* hydraulic binder, EPOJET* epoxy resin and EPORIP* epoxy adhesive, according to the thickness of the supporting walls and the damage found. ADESILEX PG1* was also used to add structural support.
Bits of damaged or flaking concrete were removed to reveal the reinforcing rods beneath.
The rods were cleaned and then treated with MAPEFER*, two-component corrosion-inhibiting cementitious mortar based on polymers in water dispersion.
The parts removed were then reconstructed using MAPEGROUT T60* thixotropic mortar, which is easy to apply to vertical surfaces without formwork. PLANICRETE* latex was added to the concrete used for smoothing purposes in order to improve its adhesion to the substrate and mechanical resistance.
Red MAPELASTIC*, reinforced with FIBREGLASS MESH* placed between the two layers, was again used to protect and waterproof the covering on the towers. The technicians again suggested using the Mape-Antique System to restore the main façade to its original glory and protect it against damp: after cleaning the work surface, a 5 mm coat of MAPE-ANTIQUE RINZAFFO* was applied to the façade, followed by MAPE-ANTIQUE CC* mortar designed for renovating and restoring buildings badly damaged by sulphate salts. To complete the work, light pink (the final colour chosen for the façade) MAPE-ANTIQUE FC/R* fine mortar for dehumidifying plasters was then applied.


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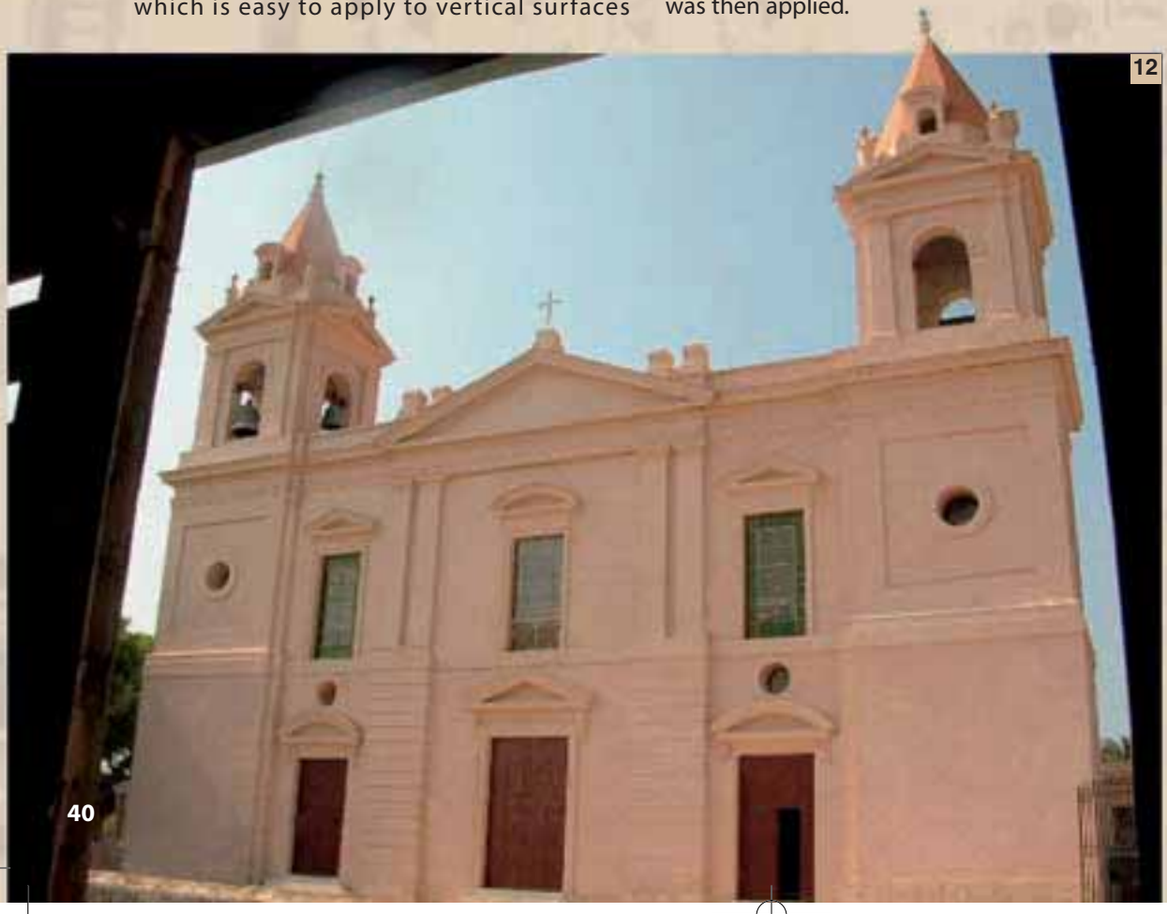
Photos 9 and 10.
Mape-Antique dehumidifying system was used on the walls, vaults and interior arches.
Silexcolor Primer and Silexcolor Paint, chosen in shades similar to the original colours, were used for protection and final decoration purposes.

Photo 11.
The picture shows a detail of the state of decay inside the church before the repair work.

Photo 12.
The church's main façade after the work was completed. The building, an excellent example of Hispanic colonial architecture, was restored to its original glory.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Interiors

The inside of the church had various kinds of coverings and coatings – concrete, plaster and stone – partly due to work carried out after it was originally built. Basically, all of the walls had been damaged up to a height of 150 cm by the constant presence of an abundance of salts, which had ruined the original paint work down the ages causing it to crumble and flake off.

Work began by scraping off the crumbling plaster; the surfaces were then washed down with water before applying the same products from the Mape-Antique range already used on the façade (MAPE-ANTIQUE RINZAFFO*, MAPE-ANTIQUE CC* and MAPE-ANTIQUE FC/R*) to dehumidify the walls.

SILEXCOLOR PRIMER* was first spread over the walls to provide a protective coating, followed by the protective-decorative SILEXCOLOR PAINT*, chosen in a similar colour to the original.

The same repair and finishing work was also carried out on the arches and vaults, which had been damaged by water seeping in down the years. Where necessary, the technicians advised carrying out reinforcement work with EPOJET*, EPORIP* and ADESILEX PG1* on the interior walls.

Side Facades

The side facades were treated with cementitious products and finished with MAPE-FRONT RASPAT* single coat coloured render (a product marketed by Ibermapei, Mapei's subsidiary in Spain), chosen in shades close to the colour of the main façade.

Other Areas

The bathrooms, kitchens and other private quarters used by the monks were tiled using KERASET* and white ADESILEX P9* cementitious adhesives, while the joints were grouted using KERACOLOR FF* and ULTRACOLOR*.

***Mapei Products:** the products referred to in this article belong to the "Products for Ceramic Tiles and Stone Materials" and "Building Speciality Line" ranges. The technical data sheets are available on the "Mapei Global Infonet" DVD/CD and at the web site www.mapei.com. The Mapei adhesives and grouts conform to EN 12004 and EN 13888 standards.*

***Adesilex P9 (C2TE):** high performance cementitious adhesive with no vertical slip and extended open time for ceramic tiles.*

***Adesilex PG1:** thixotropic epoxy adhesive for structural bonding.*

***Epojet:** two-component superfluid epoxy resin for injections.*

***Eporip:** two-component epoxy based adhesive for cold joints and monolithic sealing of cracks in screeds.*

***Keracolor FF (CG2):** high-performance cementitious grout, polymer modified, water-repellent with DropEffect®, for joints up to 6 mm.*

***Keraset (C1):** cementitious adhesive for ceramic tiles.*

***Mape-Antique CC:** pre-mixed cement-free brick-coloured dehumidifying mortar for repairing damp stone, brick and tuff masonry.*

***Mape-Antique FC and Mape-Antique FC/R:** cement-free fine mortars, respectively light-coloured and light pink, for finishing dehumidifying mortars applied on stone, brick and tuff masonry.*

***Mape-Antique MC:** pre-packed cement-free light-coloured dehumidifying mortar for restoring damp stone, brick and tuff substrates.*

***Mape-Antique Rinzaffo:** light-coloured salt-resistant cement-free pre-packed mortar to be used before applying Mape-Antique MC, Mape-Antique CC and Mape-Antique LC dehumidifying mortars on stone, brick and tuff masonry.*

***Mapefer:** two-component corrosion-inhibiting cementitious mortar for protecting reinforcing rods.*

***Mapefront Raspat:** single-coat coloured render for covering facades, distributed by Ibermapei (Spain) in Spanish-speaking countries.*

***Mapegrout T60:** sulphate-resistant thixotropic fibre-reinforced mortar for repairing concrete.*

***Mapelastic:** two-component flexible cementitious mortar for waterproofing concrete, swimming pools, terraces, bathrooms and balconies.*

***Planicrete:** synthetic-rubber latex for cementitious mixes.*

***Fibreglass Mesh:** alkali-resistant fibreglass mesh for reinforcing interior and exterior levelling compounds.*

***Silexcolor Primer:** modified potassium silicate-based primer in water solution.*

***Silexcolor Paint:** silicate-based, vapour-permeable protective and decorative paint system for cement- or lime-based renders for interiors and exteriors.*

***Ultracolor (CG2):** fast setting and drying, high-performance, anti-efflorescence grouts for joints from 2 to 20 mm, available in 26 colours. N.B.: This product has now been replaced by Ultracolor Plus.*

All the products used for this project were supplied by Mapei SpA, except for Mapefront Raspat, which was supplied by Ibermapei (Spain).

TECHNICAL DATA

San Pedro Apóstol de Versalles in Matanzas (Cuba)
Work: restoring, waterproofing and finishing work on the dome and roof; reinforcing, repairing and finishing work on the side towers and main facade; repair and finishing work on the side facades and interiors; laying and grouting of the tiles in the communal spaces.
Year: 2003
Project: Friar Minor Conventual Order (Fathers Silvano, Fernando and Roberto)
Customer: Friar Minor Conventual Order
Mapei Distributor: Arca '99 (Cuba)
Mapei Co-ordinators: Pedro Graniela (Arca '99) and Renato Soffi (Mapei SpA)