

INTERNATIONAL

# REALTÁ MAPEI



Las Vegas

Bonded to the globe

Mapei grows in Spain

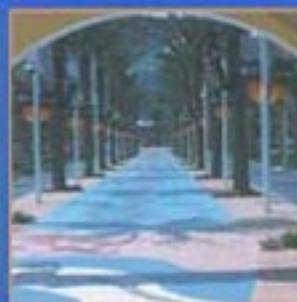
Taking shelter  
in the dock

Sunsation

Tunneling line



8



# WHAT'S NEW?

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# REALTÀ MAPEI

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**MAPEI ITALIA**

**MAPEI**  
BUILDING THE FUTURE



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# BONDED TO

Internationalisation began 20 years ago when the first plant outside Italy opened in Canada. Today foreign operations of the Italian multinational account for 65% of its turnover with 24 production plants scattered across the globe. And expansion continues: Mapei has acquired a Norwegian company and other projects are in the pipeline.

"We are a multinational company that has accepted the challenge of global competition," declares Giorgio Squinzi, President of the Mapei Group. He briefly pauses then adds, "a micro-multinational that today has 24 production plants scattered across the globe and foreign operations that account for more than 65% of its turnover, which this year will reach about Itl.1,000 billion."

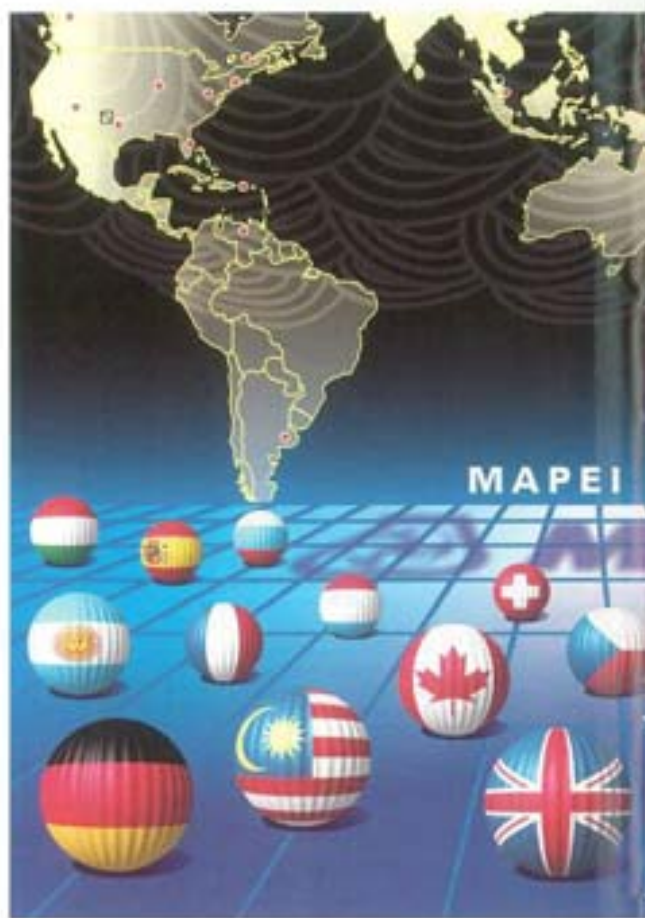
The internationalisation process began exactly 20 years ago but it was by the mid-80s that the foot was placed on the accelerator and continues to accelerate. Just in the last few weeks, after the inauguration of the Spanish and German production plants (see article on page 4), the foundations for future leaps in Europe were laid. First of all the

"conquest" of the Scandinavian market through the acquisition of the Norwegian company Rescon, a leading manufacturer of specialist products for marine and tunnelling work. Secondly, the expansion in the Czech and Hungarian markets. Consideration may be given to the Polish market in the future, too.

Outside the European market the Mapei Group has started projects in California, Ontario (Canada), Australia, and South America. And if in the Far East economic growth lives up to expectations, the Group will not hesitate to invest. There is a lot at stake and

everything is based on one simple principle: who does not move on will remain behind, becoming less competitive and losing market share. That is exactly what Mapei, a worldwide leader for flooring adhesives for the last 10 years, does not want.

This expansion is not in the least improvised even though it might give that impression. In the 1970s, Rodolfo Squinzi, founder of Mapei, said to Giorgio, his son and principal collaborator, "The future of the company must follow the ceramic tile development step by step." This strategy has always been followed in all these years with one exception, the first expansion abroad. The first factory opened in Montreal in 1979 did not produce ceramics, but rubber. That's right, Mapei arrived in Canada in the mid-70s following the trail of containers full of G12 adhesives for rubber flooring. These products were sold thanks to Giovanni Ramaceri, an emigrant from the Abruzzi region who has been in Canada for many years. These products were used in buildings and for the construction of sport facilities at the 1976 Olympics.



## Facts and figures 1999

**Mapei Group**  
24 subsidiaries

**Annual Turnover**  
ITL 1,000 billion Expected aggregate turnover  
ITL 400 billion Italian turnover  
25% Growth of Group  
20% Growth IN Italy  
Germany and Spain Highest growth rate in %

**Employees**  
1,972 Total Group employees  
835 Employees in Italy  
+25% Increase in Group employees

**Research**  
5 R&D Laboratories  
24 Quality Control Laboratories  
ITL 50 billion Spent on research  
234 Employees in research

**Production**  
24 Plants  
1.4 million tons Group production  
700,000 tons Italian production  
+25% Growth in production

**Products**  
> 300 Products  
Kerabond Record product (approx. 400,000 tons)  
Mapelfluid X404 Product with highest technology

**Internationalisation**  
1999 Acquisitions (companies with factories)  
Mapei de Argentina - Mapei Suisse S.A. - Rescon/Mapei  
**New plant** Weflingen  
**Expansions** Amposta - Mediglia

**Certification**  
Ermas Mediglia Plant

# THE GLOBE

Immediately after the first approach with rubber products, other Mapei products flooded the market and sales grew rapidly. At that point an important decision was taken: Mapei Canada was founded and a large piece of land was bought in Laval, near Montreal. In 1979, under the vigilant eye of Rodolfo Squinzi, the Milan plant for the production of P9 was moved from Via Cafiero to the new Mediglia plant. That same year, Giorgio often flew to Montreal to follow the construction of the new production plant for powder

adhesives. It was during these trips to Montreal that Giorgio Squinzi, who had an eye for detail thanks to the time he had spent in the Milan research laboratories, laid down the foundations for the future expansion of Mapei in foreign markets.

First: the "landing" must be gradual, tuned to the sector's demands. The first phase was limited to exporting finished products and using local agents, always keeping in mind that adhesives are almost always low-cost products but are heavy. Secondly, when the market potential seems

positive, it is at that point that a subsidiary can be opened to increase market share. Finally, the third phase: build a production plant near a sand quarry or where raw material is found. The plant will initially manufacture powder adhesives that

are too expensive to transport over 500 km. Only afterwards the production of other more sophisticated products is possible. Mapei's main philosophy is to privilege long-term investments. Putting the emphasis on joint-ventures where Mapei is the major shareholder, rather than creating alliances is the second principal of Mapei's philosophy. This is to avoid having two leaders of the same company. Mapei's third business principal is that each plant must have a research laboratory in order to guarantee product quality, because Squinzi's experience has taught that making the same product using the same chemical formula still does not guarantee an identical end result. Various factors influence the final product

including, for example the quality of the sand. A fourth principal - which Giorgio makes a focal point in Mapei's expansion strategy abroad - is the result of observing how Ramaceri dealt with his Canadian clients. The lesson is: if you want to make a good business deal you must be a Canadian in Canada, a Frenchman in France, an American in the U.S. In other words you must be a local. Only a local knows the culture and can correctly interpret the needs of those that live in that area. It is through this strategy that the Mapei Group became Number One worldwide. Thanks to high quality products, innovative research and excellent technical assistance, Mapei is big enough to play the leading role on the entire worldwide chess board, yet small enough to have the necessary flexibility to pick up all opportunities and continually be competitive.

"Playing the game," declares Squinzi "is not enough today. A company must overtake competitors and keep its advantage. We are trying to create tomorrow's competitive advantages." Mapei's competitiveness is growing faster overseas than at home. There's a reason for that. An inefficient bureaucratic system often paralyzes Italy and entrepreneurs prefer to invest abroad. In many interviews with Italian and foreign newspapers, amongst which the well-known American economical newspaper Wall Street Journal, Giorgio Squinzi has recounted one example which is in no way isolated. It took nine years for the necessary authorisation to come through to expand the Robbiano plant of in Mediglia, the Group's biggest, while in the U.S. and Germany it takes between two and four months to build a completely new factory.

Robbiano is not an exception; six years have already passed and still the authorisation to expand the plant in Latina has not been given. "During these six years I have built six new plants abroad," said Squinzi and the Wall Street Journal titles its article: "Mapei leaves its problems behind and discovers new opportunities abroad".

by Alberto Mazzuca



- Head office
- Main offices and factories
- Commercial branch offices
- Research centres
- Research centre for sport



# MAPEI grows Spain

The Amposta plant has been inaugurated in Catalonia. "It's the first on the Iberian peninsula but not the last," announces Giorgio Squinzi. Jordi Pujol, President of the Catalan region, praises and defines the Italian entrepreneurial spirit as "the best European model".

"We are here in Spain because we accept the challenge of globalisation," declares Giorgio Squinzi, President of the Mapei Group, and adds, "we are therefore ready to take all opportunities that arise on the Iberian peninsula and anywhere in the world." In fact, the Spanish market represents a great opportunity. Spain is showing great vitality and is one of the first European countries with an economic growth of 3.5% of GDP and an explosion in domestic consumption in the ceramic tile field. Demand has reached approximately 280 million square meters and places this European market as one of the first in the world.

The morning of Sunday, 19 September turned out to be unusually rainy. But Rino Civardi, export manager of the Italian multinational that expects to see a turnover of ITL. 1,000 billion this year, commented: "Rain during an important event like this brings good luck to the venture." That was the day in which, in the presence of Jordi Pujol, President of the Catalan region, and other Spanish authorities, the plant of Amposta in Tarragona, situated a couple of hours south of Barcelona, was officially



*The inauguration of the plant in Ampost took place under the rain. Jordi Pujol, President of the Catalan region, uncovers the placard as - from left to right - Mayor Juan Roig, Giorgio Squinzi, President of Mapei Group, Louis Uriol, Managing Director of Ibermapei, look on.*

inaugurated. It is the first production plant of Ibermapei SA, one of the Mapei Group's 24 subsidiaries. The day was not casually chosen - it coincided with the arrival in Barcelona of the 14th stage of the Vuelta, the Spanish cycling race where the Mapei-Quick Step team was taking part with riders Pavel Tonkov and Andrea Tafi.

Mapei's victory with Rominger at the Vuelta in 1994 along with other Spanish riders, such as Abraham Olano, 1995 world champion, who have raced with Mapei colours surely helped spread the fame of Mapei's trademark. In the late afternoon the team members mingled





*Jordi Pujol shows great interest for technology developed in Mapei's Spanish plant.*

with the other 200 guests at the inauguration, triggering a race for autographs and giving a final touch of glamour to a day that started off with a simple but touching ceremony.

The new plant currently employs 62 people, has an annual production capacity of 200,000 tons and can produce all the powder products in Mapei's range. Today, thanks to the on-site manufacturing capacity together with products imported from Italy, the complete Mapei range is now available on the Spanish market, and Mapei supplies the most prestigious construction sites. Already in 1999 the annual turnover reached PTA 2,000 million, a figure that represents a 45%

increase with respect to the previous year. The plant covers a total 26,000 m<sup>2</sup>, including 7,500 m<sup>2</sup> covered with two new warehouses, one of 4,500 and the other 1,500 m<sup>2</sup>. Luciano Trussardi, the manager in charge of the factory points out that, "This new establishment is the most technologically advanced of the Mapei Group." It was constructed in a few months: work began in June 1998 and the company got the maximum collaboration possible from the Amposta communal administration. "We are always happy to welcome those who bring extra employment," declares Mayer Juan Roig, "And we are always ready to collaborate with the company for any necessities arising in the future." After recalling all the bureaucratic problems in Italy (authorisation to expand the Mediglia plant took nine years, while after four

years there has still been no progress made in Latina) and seeing the collaboration with Spain today, Dr. Squinzi declared, "Spain seems to be on another plant." And maybe it is a different plant. Or at least Catalonia is, a region that has a strong autonomy with respect to the Madrid government and can boost faster economic



*The new plant covers 26,000 m<sup>2</sup> and has an annual production capacity of 200,000 tons of adhesives. The plant is situated in a strategic part of Spain - Catalonia - the fastest developing region, and the Ebro valley, home of the Spanish chemical industry. Amposta is on the National Route 340 that links the whole of Spain and is strategically positioned near the Spanish ceramic district which is concentrated in the Valencia area.*



*The Mapei-Quick Step team riders who were taking part in the Spanish Vuelta race also had a good time. Almost a month later, 23 October, the world champion Oscar Freire was in Amposta again to sign the contract that ties him to Mapei-Quick Step for the next three seasons. Photo: Giorgio Squinzi welcomes the champion.*





*In line with the Mapei Group philosophy, the plant of Amposta has an area dedicated to training as well as production and research. Above and right: the large congress hall and an area for practical demonstrations.*



growth than the rest of Spain. Pujol, leader of the centre-left party and supports Aznar's government, summarises the difference between Spain and Italy with what seems a joke but in reality is not, since it exactly pictures the Italian reality." Two completely different cultures that consequently lead to different choices. Speaking sometimes in Spanish, sometimes in Catalan and occasionally in Italian, Pujol underlines the differences in two other occasions: he affirms "Mapei's good sense" in choosing to invest in Catalonia, a region with its own economic development model that is trying to attract foreign investment in order to create jobs. He praises the Italian entrepreneurial spirit, especial that of Lombardy and Veneto, which he believes "is still the best European model." These are words that are rarely heard in Italy.

Ibermapei's history began in September 1991 when the company's headquarters was established in Alcorcon, near Madrid. In 1992 the first commercial outlet to satisfy the demands of the Spanish market was created in Badalona, near Barcelona. "In the beginning," recalls Adriana Spazzoli, the Mapei Group's Communications and Marketing Department Manager, "Ibermapei promoted and introduced products for the installation of resilient flooring. Then, in April 1993, they started selling the ceramic product line." In 1995, after the death of the first director Eduardo Cordero, Ibermapei's headquarters were transferred to Badalona under the direction of Luis

Uriol Casado. The old headquarters were transformed into a distribution centre for the central-southern area of the peninsula.

With Uriol a new development phase began. As the market expanded, new technical and commercial offices opened. The first in 1996 in Palma di Mallorca, which supplies the Balearic Islands; the second in 1997 in Onda, near Castellon - the area that produces the greatest quantities of ceramics in Spain - which supplies the whole of Spain. In 1997 Mapei bought Hidro Recubrimientos, a production company in Amposta which specialises in manufacturing "monocapa" renders

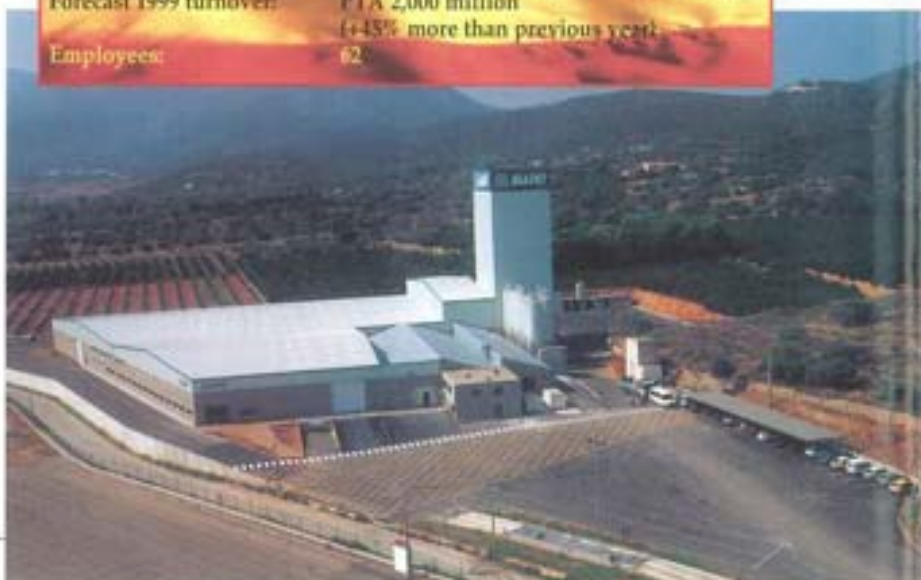
(pre-coloured renders for exteriors). After an initial period of adjustment it was decided to extend the production range in order to produce powder adhesives such as Keraset, Kerabond, and Keraflex. At the same time production of the "monocapa" line

continued as it has a big market in Spain and a marketing drive was undertaken to increase sales. In 1998 the two companies merged under the name Ibermapei. "This is our first factory in Spain," announced Mr. Squinzi, "but it will not be the last." The guests and the Mayor, Pujol, applauded this comment which clearly indicates Mapei's interest in taking an active role in the growth of this market sector.

After the plant visit, the inauguration ceremony pleasantly continued at Masia Pla dels Catalans, a restaurant offering a wide range of features, including a swimming pool and a golf course. There is even a small bulling arena where wishful youths were able to affront young bulls until the arrival of Mapei's cycling team riders. At that point bullocks and aspiring matadors left the scene to stars such as Tonkov and his team-mates.

#### MAPEI'S AMPOSTA MANUFACTURING SITE: TECHNICAL DATA

Surface area:	26,000 m <sup>2</sup>
Covered area:	7,500 m <sup>2</sup>
Production capacity:	200,000 tons/year
Production:	all powder products of the Mapei range
Forecast 1999 turnover:	PTA 2,000 million
	(+45% more than previous year)
Employees:	62





*Some of the most prestigious constructions in Spain where Mapei products have been employed*



**Museum Cavas Codorniu - Sant Sadurni D'Anoia**  
Installation of 20x20 cm ceramic floor using GRANIRAPID, MAPESIL AC and ULTRACOLOR on screeds made with TOPCEM



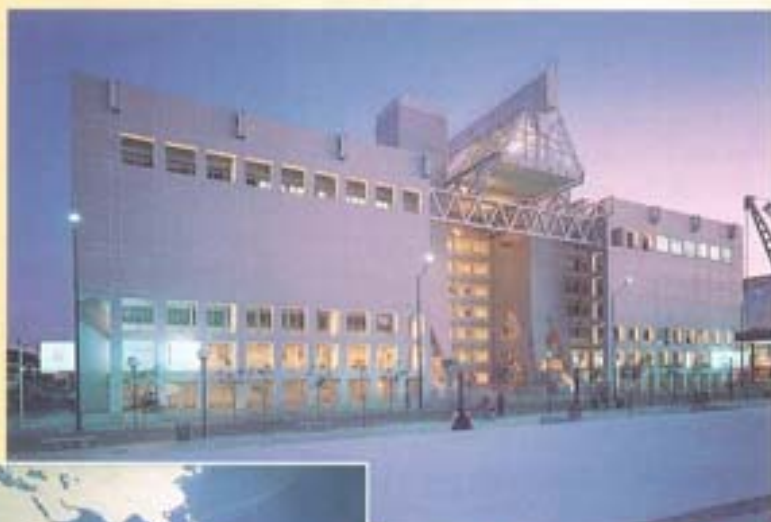
**Alcampo shopping center - Madrid**  
Installation of PVC flooring using PLANOUT, ROLLCOLL and GRANIRAPID



**Athletic Stadium - Madrid**  
Installation of rubber flooring using ADESILEX G19



**National Library - Madrid**  
Installation of parquet using PRIMER G and ULTRAPLAN



**Expo - Palazzo Italia - Seville**  
Installation of PVC flooring using PIANOCEM, ULTRAPLAN and ADESILEX G19



**Horta Velodrome - Barcelona**  
Synthetic grass laid using ADESILEX G 19



# "CAVA" CODORNIU

The wine cellars of Spain's most famous champagne producers, the Codorniu family, date back to 1895. The poor conditions of the cellar flooring called for highly specialised intervention.



PHOTO 1

The word *champagne* is used to refer to the wine developed by the Benedictine monk Pierre Pérignon three centuries ago, after he discovered a technique for controlling the bubbles in wines in the Champagne region. Some time passed between Dom Pérignon's discovery and the birth of the Catalan version of bubbly wine.

In Catalonia during the 12th century there existed a congregation of four church parishes. Sant Sadurn de Noya was one of these church parishes that, in time, became the capital of Cava, Sant Sadurn d'Anoia, a township in the Alt Penedès natural park, 40 km from Barcelona, Spain. Sant Sadurn d'Anoia and, more precisely, the Codorniu wine cellars, are the cradle and homeland of Cava. The Codorniu family is located in the town where this bubbly Soave wine was produced in Spain for the first time more than 100 years ago.

The Codorniu family's fame has been consolidated over the last 500 years. The family dates back to the mid-16th century to farmer grape-grower, Jaume de Codorniu. The Codorniu family's activities grew through its ancestral links with other families, a good example being the marriage of Anna Codorniu to Miguel



PHOTO 2

Raventós, owner of a fertile vine-yard and renown wine cellars.

More than 200,000 people arriving from all over the world to visit Spain spend either a morning or an afternoon at the Codorniu wine cellars during their stay; getting to know the massive plantation and discovering how this champagne is made.

## The cavas

The museums are perfectly integrated with the wine cellars so that guests can admire the huge presses that were used in the old days, the arches, walls and tile flooring that still seem to emanate the bouquet of the many vintages. These living memories of the past can also be found in the Casa Codorniu which was enlarged in 1895. During this period, the





### Project under pressure

The initial reconstruction project involved substituting the 30-year-old flooring and transforming the nave (pressing room) into a museum. Due to



Codornius built the cava (wine cellars in grottoes) and the work was carried out by Josep Puig i Cadafalch. A designer, mathematician, town planner, historian, politician and architect, Cadafalch has rightly been defined as the first representative of modern architecture.

60 years from the date of its construction (1895-1915), the cava was declared a national historic monument by royal decree on the 9th of January 1976, the first decree signed by Juan Carlos I, King of Spain.

30 years ago, the building that originally housed the press became the "Museo del Cava"; the only museum in Spain to contain an interesting and curious collection of objects, instruments and equipment for the cultivation of vines and the processing of wine. Its modernist nave is 76 meters long by approximately 11.5 meters wide, with an 8 meter vault which is mostly built in brick.



the high volumes of visitors and the lack of grouting between the tiles, the surface was in a very poor state of repair (photo 2). A series of unforeseen problems were encountered right away when demolishing the flooring and removing the first layer of substrate and the foundations. Problems, such as the discovery of walls that supported part of the flooring (photo 3), wells for antique presses, storerooms as deep as 5 meters (photo 4) and substantial differences in the level of the flooring caused by the low consistency of the materials used at the time for filling in the foundations. All told, the screed and the flooring were highly unstable.

The owners, among other things, used the hall for official receptions, commercial activities, international presentations and cultural events, etc. For a space with these



PHOTO 8

characteristics it was therefore necessary to entirely revise the initial project in order to create a space with a high-quality, professionally installed foundation so that the specially manufactured ceramic tiles could be installed to the standards required for such occasions.

**From the boiling vats ...**

The cavities resulting from the demolition of ceramic tiling, antique gravel flooring and substrates (photo 5



and 6) were filled using over 800 tons of concrete. 75 m<sup>2</sup> of 30 cm thick slabs were constructed to preserve the vats sunk



PHOTO 9

deep into the ground and the storerooms (photo 7).



PHOTO 10

Before installing the chosen ceramic tiles an almost perfectly flat surface had to be achieved, and the level of the ground had to be built up to its original level (photo 8 and 9). TOPCEM, a normal-setting rapid-drying binder which is particularly recommended for this kind of construction, was used to get a flat surface. An example of the attention to detail and level of professionalism in executing the work is the tests carried out on various parts of the screed to find out the percentage of residual moisture present once dry. The tests were carried out with a special instruments by a Mapei technician (photo 10). The ceramic tiles, especially manufactured by Cerámicas Comella, were 20x20 cm clinker type tiles with a rustic finish and

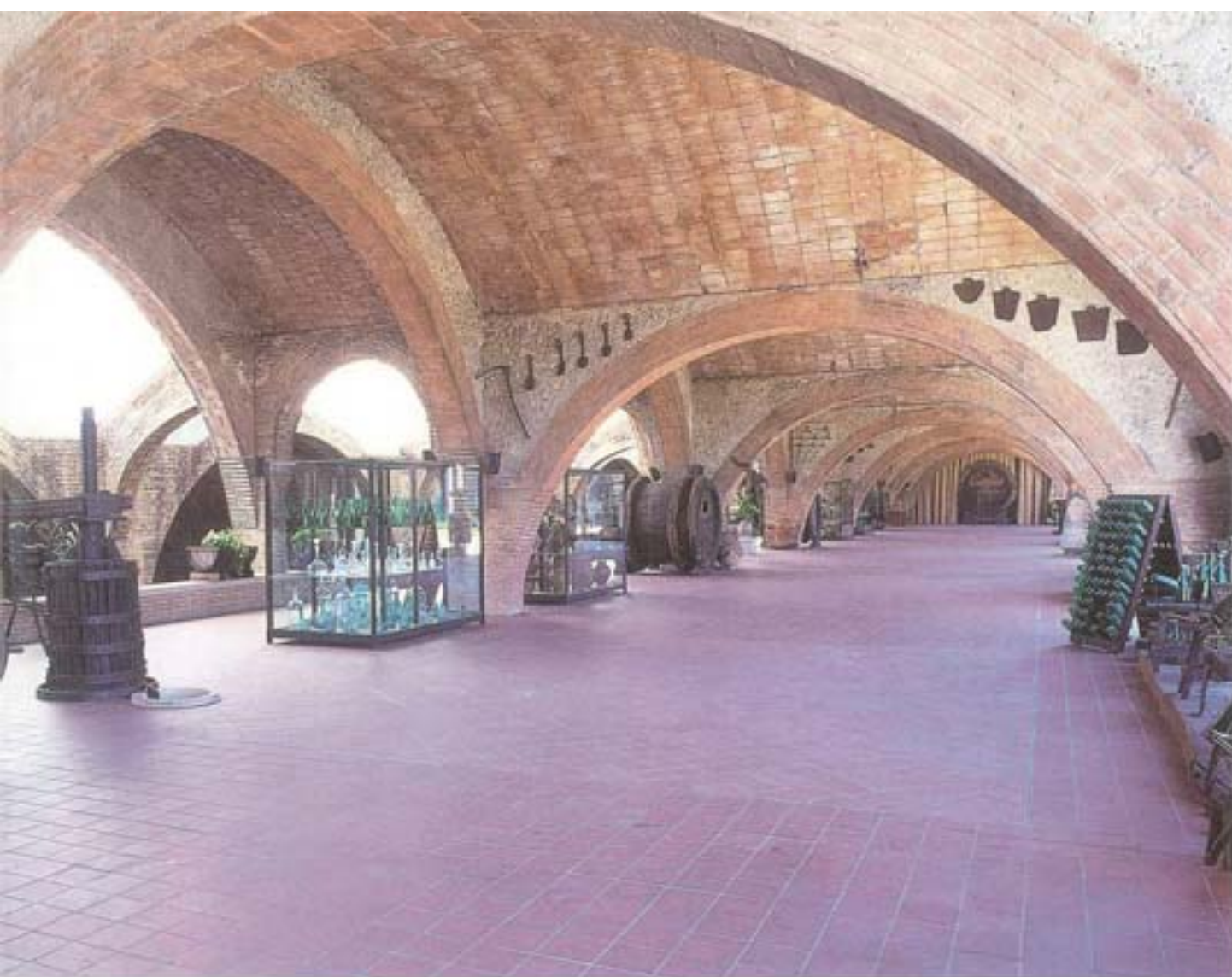


PHOTO 11



PHOTO 12





low absorption. The installation required absolute mastery of the size and dimensions of the hall, since the mosaic design was such that not a single tile could be cut. The seven mosaics that correspond with each of the *crujia de arco* (arched aisle) are turned 45 degrees with respect to the adjoining floor and are framed by a brass profile.

All the tiles were installed without cutting them on site (photo 11 and 12). The architect Lluís Rivas Estalella (the project manager) monitored progress every step of the way. Because of the enormity of the project and the time available, the installation of the ceramic tiles was subcontracted to various specialised companies, as was the case with "Colocaciones '92" (Cerdanyola del Vallés). In all there were 20 professional installers in five different groups dedicated just to installing the tiles. GRANIRAPID, a fast-setting cement-based adhesive with high mechanical strength was used for the installation of the ceramic tiles.

Right from the beginning the grouting and expansion joints were specially treated. The expansion joints were sealed with MAPESIL AC, an acetic-based silicon sealant for movement joint with a maximum 20% expansion of the initial joint size, while the grouts were filled with ULTRACOLOR, a rapid setting and hardening cement grout for joints 2 to 20 mm wide, the only product on the market that does not produce efflorescence.

These advanced solutions for the installation of the flooring will guarantee the resilience required to withstand the wear that this flooring will be subject to, i.e. large numbers of visitors, heavy loads and frequent cleaning etc. The flooring solution chosen also improves maintenance and guarantees a very attractive finish.

*The Technical Data Sheets of the products mentioned in this article are contained in Mapei binder No. 1 "Ceramic Tile Installation Products".*



#### TECHNICAL DATA

**Museo Cavas Codorniu - Sant Sadurn d'Anoia**  
- Alt Penedés (Spain)

**Year of construction:** 1895

**Year of restoration:** 1998

**Project Manager:** Architect Lluís Rivas Estalella

**Contractor:** Totcon S.A. - Villafranca del Penedés (Spain)

**Material:** 20x20 Clinker type ceramic tiles - Cerámicas Comella, Granollers

**Mapei products:**

TOPCEM

GRANIRAPID

MAPESIL AC

ULTRACOLOR

**Mapei coordinator:**

Vicenç López, Ibermapai - Spain

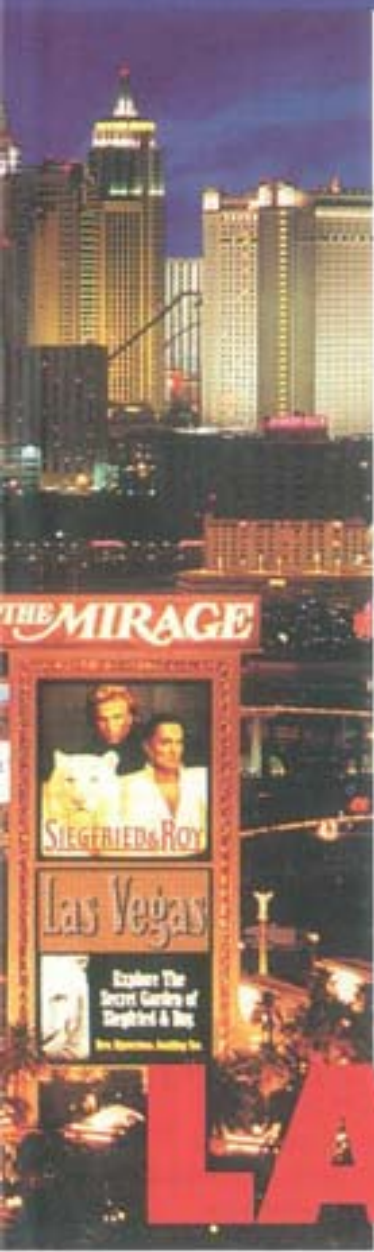




Although today Las Vegas presents itself as a modern and futuristic city with just a few buildings dating back to the 1950s, it actually dates back to 1829, when a young Mexican discovered an oasis that shortened the commercial route linking Santa Fe to Los Angeles. This area, at the time named Nuestra Señora de los Dolores de Las Vegas Grandes, was later renamed simply Las Vegas. The development of the city started after the railway industry decided to make it a stopping point. Since 1904 the railway workers' needs began to grow and hotels, restaurants, shops and saloons started to spring up in the Nevada desert. The Great Depression of the 1930s brought a new flow of energy and labour for the construction of the new Hoover Dam with thousands seeking jobs.

In 1931 Nevada legalised gambling to finance the public school and to reduce the rampant corruption, thus laying down the basis for the Las Vegas we know today. The effect of the new law was immediate: thousands of dollars from





A fantasy world of colossal hotels and casinos animate the largest and most opulent gambling and entertainment city of the world.

by Mike Venturelli - Mapei Corp. - Usa



# LAS VEGAS

gambling flooded into the city and new hotels budded everywhere. In 1941 the Strip was build - the main boulevard where still today the most fabulous entertainment sites are concentrated.

## A fantastic trip down the Strip

One of the reasons for entertainment pioneers to come to this corner of the desert was its constant warm climate. The city's major attractions are located on the Las Vegas Boulevard, more commonly known as the Strip, where the concentration of luxurious hotels and gambling casinos leaves visitors dizzy. Being the world's reference point for entertainment, Las Vegas calls for continual re-modernisation of its structures. For the year 2000, Las Vegas built new and larger luxury hotels and casinos down the famous Strip. To satisfy the entertainment needs of the new millennium, many hotels have been completely demolished and rebuilt. Using the most advanced technology, the new



hotels recreate the atmosphere and charm of the past and present cultures. Millions of fluttering lights attract pleasure-seeking visitors, adults, children, families, gambling addicts and anyone who wants to take time out in a problem-free world.

Great architectural remakes of historical masterpieces attract the attention of visitors. Luxor, New York New York, Monte Carlo ... hotels that ambitiously recreate the atmosphere of a whole city in a single building. Such intense construction activity requires a lot of courage and farsightedness on behalf of investors and planners. They have had to adapt to marketing strategies aimed at avant-garde levels of entertainment and technology.

Las Vegas 2000 is linked to the initiative of the eccentric multimillionaire Stephen Wynn, who in 1988 decided to transform his Mirage hotel-casino into one of the marvels of the world. Since its opening day, the Mirage proved Wynn had great intuition, triggering the real-estate boom which seems to have no end. This is the umpteenth bet that Las Vegas has won, but this time to the advantage of all gamblers.

#### A market in continual expansion

The population of Las Vegas is 1.2 million (full-time residents). The hotels can house up to 1 million people when completely sold out and they are typically 85% full.

#### CONSTRUCTION VALUES FOR LAS VEGAS

Year	Total Costs	Residential	Hotel/ Commercial
1997	\$2,233,145,043	10%	90%
1998	\$1,975,643,565	10%	90%
1999	\$1,714,637,208	5%	95%

#### CERAMIC TILE AND INSTALLATION PRODUCT MARKET

Total Value \$23,400,000

#### BUILDING PERMITS - DECEMBER 1999

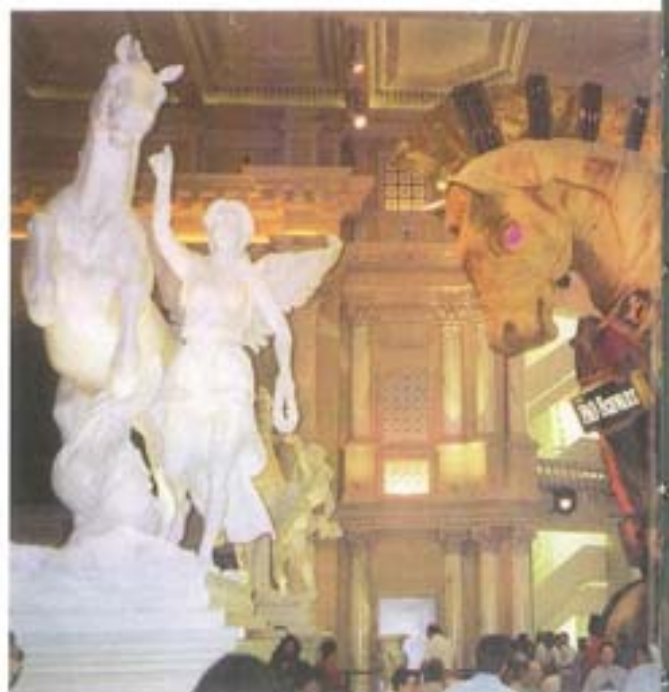
Category	Units	Permits	Valuation
Single family dwellings	575	575	\$57,697,313
High-rise flats/ apartments	34	4	\$1,375,780
Semi-detached houses	90	6	\$3,766,477
Hotel + Motel	1	1	\$20,000,000
Commercial	0	27	\$29,186,280
All others	0	446	\$5,117,442
<b>TOTAL</b>	<b>700</b>	<b>1059</b>	<b>\$117,145,262</b>
Renovation projects	0	423	\$26,357,715
<b>TOTAL</b>	<b>700</b>	<b>1482</b>	<b>\$143,502,977</b>
<b>YEAR TOTAL</b>	<b>11,593</b>	<b>21,384</b>	<b>\$1,714,637,208</b>

#### Mapei leads the game

To list all Mapei's activities in Las Vegas would take too long. It suffices just to point out that Mapei's sales in Las Vegas have skyrocketed from less than \$200,000 in 1997 to over 1.2 million in 1999, thanks to effective marketing and technical expertise. Mapei provides specialised Technical and Sales support that works hand-in-hand with architects, planners, local suppliers and technical sales reps to lay down technical specifications for the more important projects involving Mapei products. Once the project has been awarded to the General Contractor, the sales reps contact the tile and flooring contractors to take orders. In addition, the sales reps are responsible for providing assistance on site to ensure installation is carried out in accordance with Mapei's standards.

A number of prestigious hotels have used Mapei products - the Rio Hotel, for example, used ECO 185 adhesive and the majority of the rubber and linoleum flooring in Las Vegas was installed using ADESILEX G19 polyurethane adhesive.

To give Realtà Mapei International readers an idea of the company's level of involvement, below there is a selection of hotels that illustrate just what can be done with tried and tested ceramic or stone floor installations.



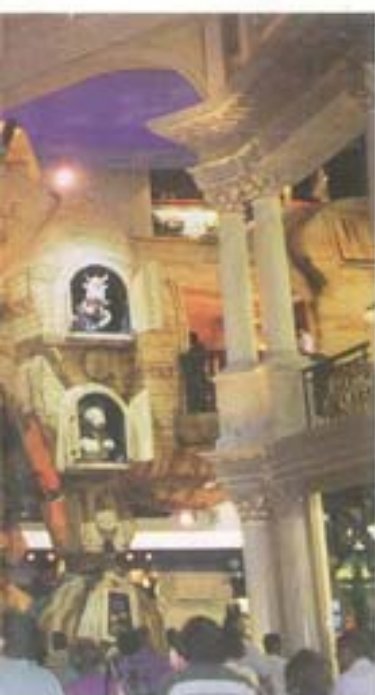




## Caesars Palace

First opened in 1966, the Caesar's Palace is one of the first and most famous hotels and casinos in the world and is inspired by ancient Rome, with its copies of classical art and sculptures paying homage to the Roman Empire. To get an idea of the colossal dimensions of this hotel it suffices to know that two Grands Prix were held in its

parking lot. The hotel expanded its opulent facilities for the new millennium adding a new 29-storey tower with 1,134 rooms. Marbles imported from 23 different countries were used for the flooring of the lobby, the halls leading to the casino, guest bathrooms and the public areas by the lifts. Renovation in these areas involved the use of marble, but glass mosaics were also used for the fountains along with a 24-carat gold mosaic. The Carrara Marble Company of America – which has had commissions for over \$20 million over the past five years – used Mapei's ULTRAFLEX II and grouts for the installation of the flooring.





## Bellagio

Built on an area of 10 acres in the centre of the Strip, the Bellagio hotel recalls the Italian residential atmosphere of Lake Como and is named after the locality which, literally translated, means "to feel at ease". Enchanted by the beauty and sobriety of Como's architecture, Stephen Wynn set out to recreate the Italian style in the 3,600 rooms (a figure higher than the actual population of Bellagio) which have been fully booked since the opening day. Steve's slogan for this multi-faceted entertainment centre is "it's what God would have made if he



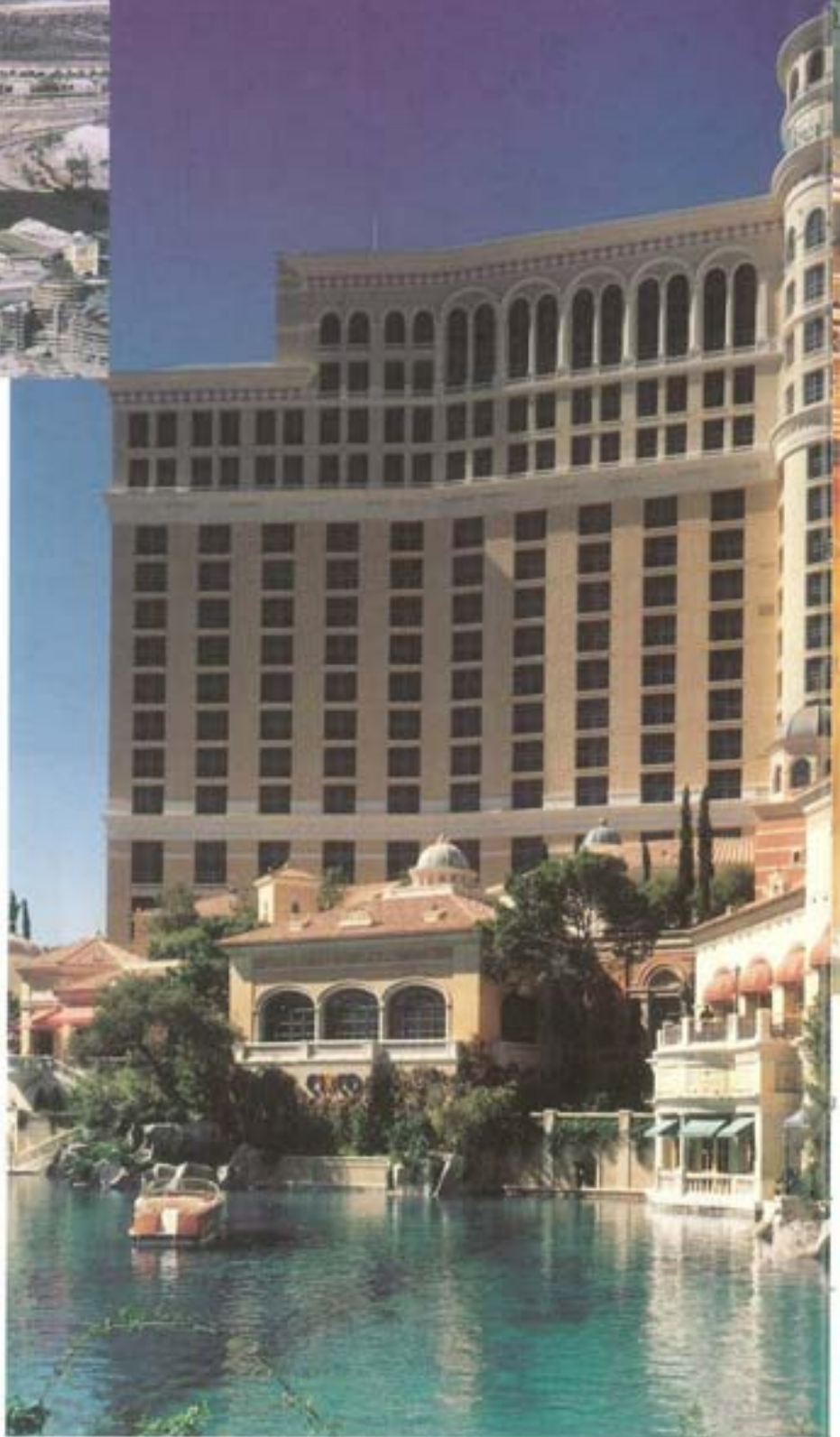
had the money." In fact the hotel is decorated with authentic 19th- and 20th-century art. Millions were spent both at Sotheby's and Christie's to

put together the collection of works by Manet, Gauguin, Picasso, Van Gogh, Matisse, Degas and others that "embellish" the walls of this dazzling museum-cum-hotel-cum-casino.

The Bellagio is surrounded by an artificial lake containing an original 1960's wooden Riva speedboat, and its opulence is displayed in the lobby and Villa Suites which are installed with Portuguese marble accented with Italian marble mosaic patterns. The delicate

quality of the marble called for an extremely professional installation using high-tech products. Almost every surface of the Spa is covered in unique Australian limestone with inlays of marble mosaics.

The Carrara Marble Company of America completed the Spa and Villa Suites installations using Mapei's PRP 315, ULTRAFLEX II and Mapei grouts.





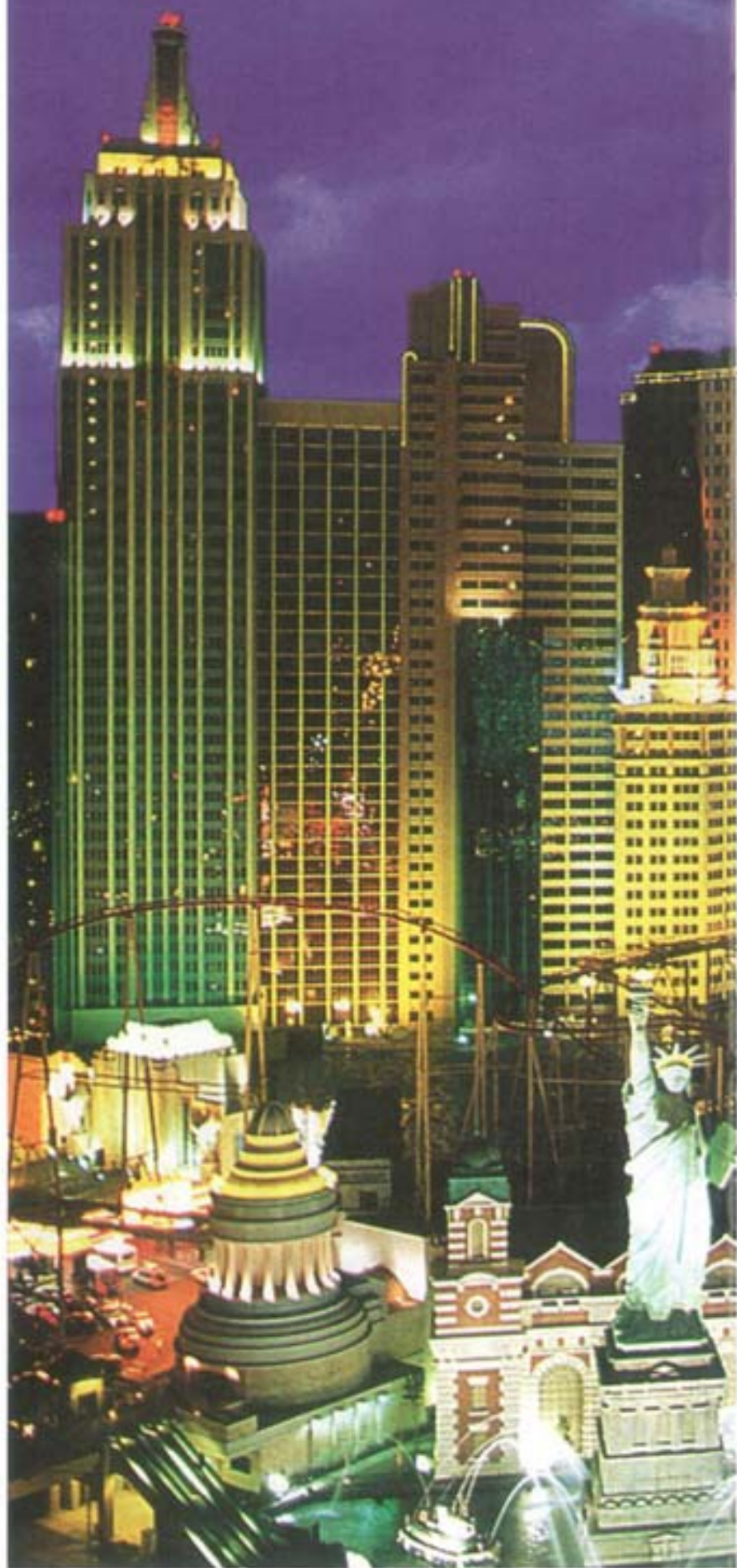
## New York New York

With over 2,000 suites and a casino covering no less than 80,000 m<sup>2</sup>, the New York New York is the most stunning on the Las Vegas strip. It reproduced the Manhattan skyline with a replica of the Statue of Liberty, the Coney Island roller coaster and a replica of the Brooklyn Bridge. With its 12 hotel towers – including the tallest casino in Las Vegas – it really looks like a corner of New York City that has sprouted up in the middle of the desert.

11,000 m<sup>2</sup> of cotto tiles were used for the flooring in the rooms and passage ways, while ceramic

tiles were used in the guest and public bathrooms.

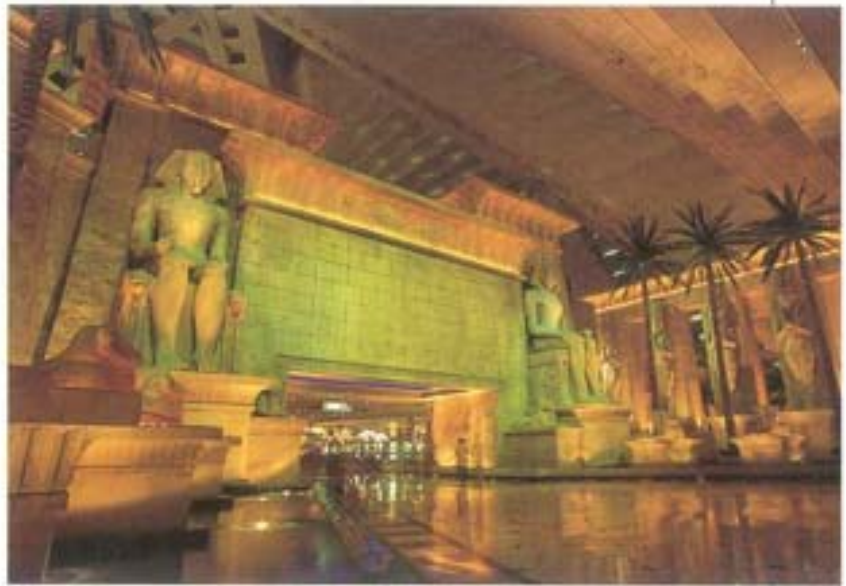
ULTRAFLEX II and Mapei grouts were used extensively for installing tiles in many parts of the New York New York. Mapei's PRP 315 was also used by Western Tile & Marble, Superior Tile and other contractors involved in laying the flooring in the 2,000 guest bathrooms and in the public spaces.



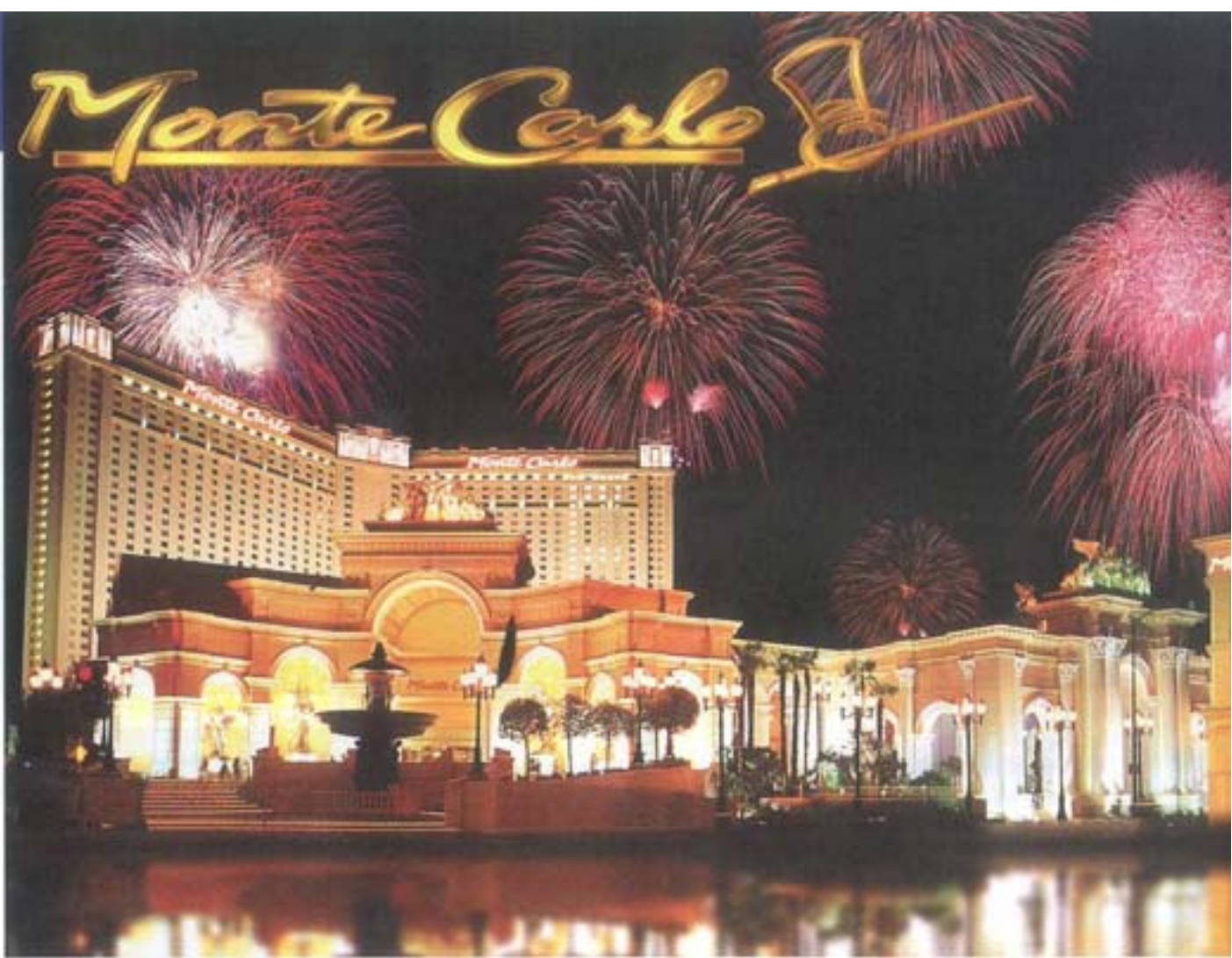
## Luxor

Probably no hotel in the world has ever tried to challenge the sacredness of ancient Egypt without seeming disrespectful. The Luxor hotel definitely tried with its 30-storey bronze-coloured glass pyramid plus a couple of other small pyramids that attempted to come close to the splendour and mysticism of the pharaoh era. A beam of light emanates from the top of the glass pyramid and is the most powerful in the world – equal to 40 billion candles. Its atrium is large enough to stack nine Boeing 747s on top of each other. Here the electricity bills alone add up to over \$3 million a year, while the Sultan of Brunei gambles \$250,000 a time on ten different roulette tables and someone even whilst sat on his horse.

It seemed impossible to reconstruct years of history in a question of a few months, but help came once again from Mapei's installation systems. Western Tile & Marble installed limestone imported from Portugal by Villeroy & Boch in the 1,948 guest rooms using Mapei's PRP 315, ULTRAFLEX II and Mapei grouts.



# Monte Carlo



## Monte Carlo

The Monte Carlo Hotel is one of the most elegant hotels in town. Guests enjoy an atmosphere characterised by Renaissance statues surrounded by fountains and waterfalls. And that's just outside!

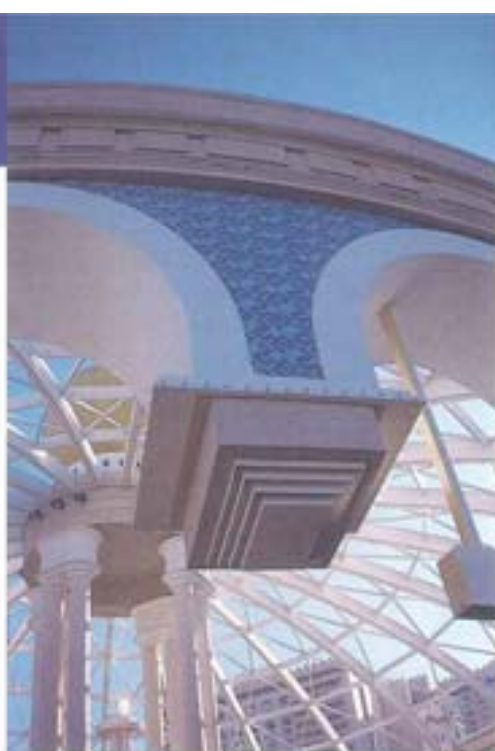
Exhausted by hours spent at the slot machines and at the gambling tables, the American Monegasques can relax in their rooms tiled with Italian marbles and smooth granite, dreaming that one day they really will be able to reside in the Principality of Monaco. As Steve Wynn says, "it's true that we are not masters of our destiny, but we can certainly design it." Here too Western Tile & Marble installed Villeroy & Boch's limestone imported from Portugal using Mapei's PRP 315, ULTRAFLEX II and grouts. PRP 315 was chosen for its waterproofing characteristics and the way it prevents cracks appearing.



## Sahara

It took two years and \$100 million to renovate the Sahara Hotel & Casino which welcomes guests to a warm and stimulating atmosphere that recalls African desert oasis. Built in an Arabian style, the hotel has large spaces dedicated to tourists, one of which houses a massive Indy race simulator that, according to professional drivers, is very close to the real thing.

By renovating the hotel and building an inviting new swimming pool, the hotel's president, William Bennett, intended to return the famous hotel to its 1950 splendour when it was one of the stars of the Strip. Among its frequent guests were Frank Sinatra and Sammy Davis Jr. Tall, blue and green tiled towers sprout over the Nevada desert recalling the Moroccan landscape. Extensive renovation in the lobby, casino and concierge lodges was carried out by Castello Tile using Mapei's KERAPLY, ULTRAFLEX II and grouts.





## Sunset Station

Before leaving this lively gambling city it's worth paying a visit to Sunset Station in Henderson, a hotel that pays homage to Spain and is built in typical Iberian style throughout – from the rooms to the casino. Built on a 100 acre site, the hotel is the most popular among Las Vegas fans of those not on the Strip. It suits all tastes with Mexican, Italian and American restaurants, the casino, a multi-screen theatre with 13 screens, a 300-seat concert hall, bar and poker room are all enclosed in a single complex for a complete holiday. In the centre of the facilities is the Gaudi Bar – a real homage to that most eclectic of Spanish architects. The floors are in cotto and ceramic tiles that perfectly interpret Spanish style. Castello Tile and others laid the tiling using Mapei's PRP 315, ULTRAFLEX II and grouts.







*We wish to thank "Tile & decorative surfaces", November 1999, from which extracts have been taken.*



# LAS VEGAS

## TECHNICAL DATA

### Different requirements, a single method

Nothing could be left to risk when constructing these huge entertainment edifices. Hotel and casino owners rightly summoned the help of building specialists, perfectly aware of the fact that even a minor error in making a repair could mean billions of dollars lost.

That's why tried and tested methods were used and adapted to different needs: for example, ULTRAFLEX II\* - a single-component, high-performance polymer-modified mortar which bonds ceramic and natural tiles in one go. ULTRAFLEX II\* was used extensively by contractors on various sites, because it helps avoid problems that usually arise when installing tiles. Ease of use and versatility are the advantages that made ULTRAFLEX II\* popular for most of the new constructions in Las Vegas. KERAPLY\* was used in other cases.

Mapei PRP 315\* was used in a lot of cases to create a waterproof layer before laying the tiles. PRP 315\* forms a protective barrier in just a few hours, and sets into a crack-resistant membrane which isolates the tiles from possible cracks in the underlying foundation. ULTRA/COLOR\* - a rapid setting and hardening, non-shrinking cement grout formulated in Mapei's laboratories - was used to grout internal and external wall and floor tiles. ULTRA/COLOR\* is a mixture of special hydraulic binders, graded aggregates, special polymers and pigments that remain stable even after prolonged exposure to outside elements.

\*These products are produced by Mapei Corp. (USA)



### Site description:

#### CAESARS PALACE

Year: 1998

Materials used: Marble, DalTile glass mosaics, Bisazza gold mosaics

#### Contractor:

Carrara Marble Company of America

#### BELLAGIO HOTEL

Year: 1998

Materials used: Portuguese marble and Italian marble mosaics; Australian limestone with marble mosaics inlays

#### Contractor:

Carrara Marble Company of America

#### MEW YORK NEW YORK HOTEL

Year: 1997

Materials used: Cotto, ceramic tiles

Contractor: Western Tile & Marble, Superior Tile and others

#### LUXOR HOTEL

Year: 1998

Materials used: Portuguese limestone

Contractor: Western Tile & Marble

#### MONTE CARLO HOTEL

Year: 1998

Materials used: Portuguese limestone

Contractor: Western Tile & Marble

#### SAHARA HOTEL

Year: 1998

Materials used: DalTile ceramics

Contractor: Joe Cattello Tile

#### SUNSET STATION HOTEL - Henderson

Year: 1998

Materials used: DalTile ceramics

Contractor: Joe Cattello Tile and others

### The Mapei team in Las Vegas

Mike Venturilli: Area Manager

Lonnie DeGooyer: Technical Sales Rep

for Ceramic

Steve Hobbs: Technical Sales Rep for FCIP

Kevin Vaughn: Architectural Rep

All product lines

# SANT'APOLLINARE NUOVO

High technology systems have been used in the restoration and reconstruction of the Basilica complex of Sant'Apollinare Nuovo in Ravenna.

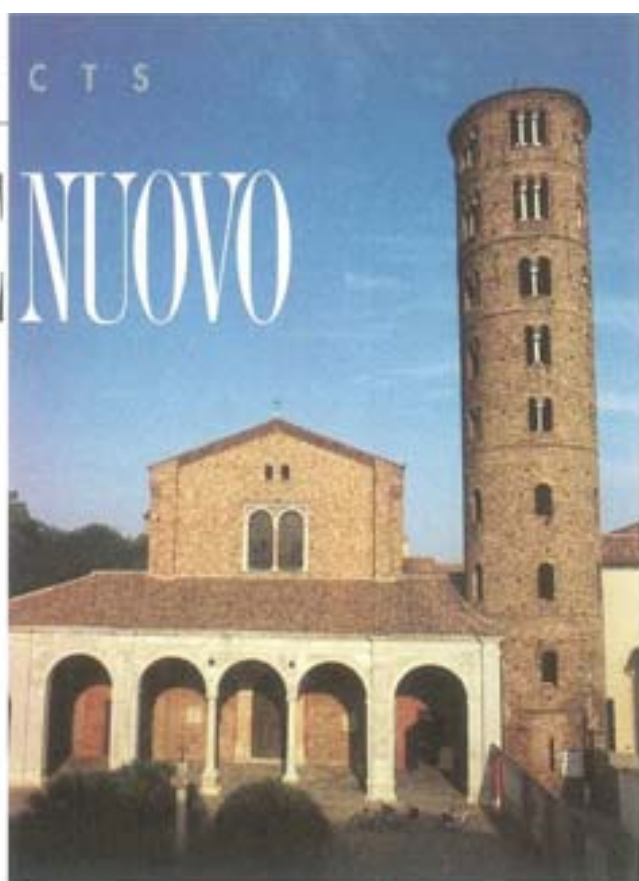
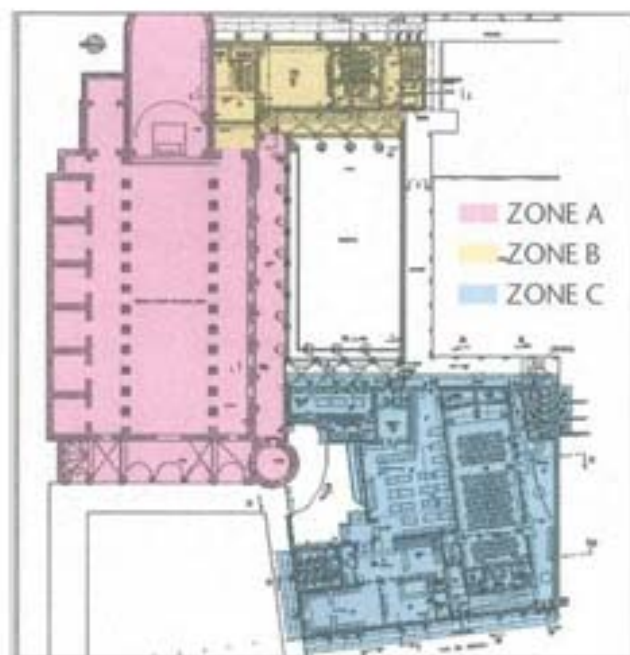
The Basilica of Sant'Apollinare Nuovo in Ravenna was built during the reign of Theodoric (493-526) as an Arian Christian Palatine Chapel attached to the adjacent Theodoric Palace. Its mosaics are among the works of art listed by UNESCO as being the "Heritage of Mankind". 1,500 years after its construction, the Basilica complex was badly in need of restoration. The work was one of the many projects financed as part of the Holy Year 2000. The contract was awarded to the Consortium Ravennate delle Cooperative di Produzione e Lavoro and the work was executed by the Ediltecnica company of Ravenna.

The project was divided into three main sections:

1. restoration of the Basilica of Sant'Apollinare Nuovo;
2. construction of the Mosaic Museum in the Theodoric Palace;
3. repair of the buildings located between the Basilica of Sant'Apollinare Nuovo and the Theodoric Palace, along with the construction of a multi-functional auditorium and a visitors' welcome centre (which includes the refreshment room).

The attention to quality required by the project prompted Mapei to make preliminary analysis of the materials originally used to build the Basilica complex. Tests were performed by the Mapei Research and Development Laboratories which used ultra-sophisticated technology to determine the various techniques and products to be used in the restoration.

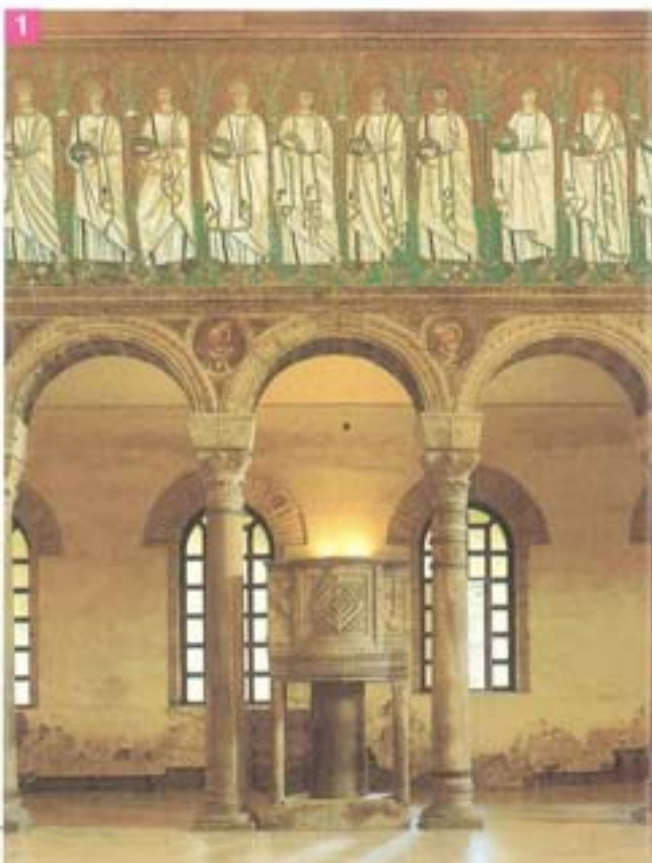
Above: the Basilica of Sant'Apollinare Nuovo in Ravenna built during the reign of Theodoric (493-536).

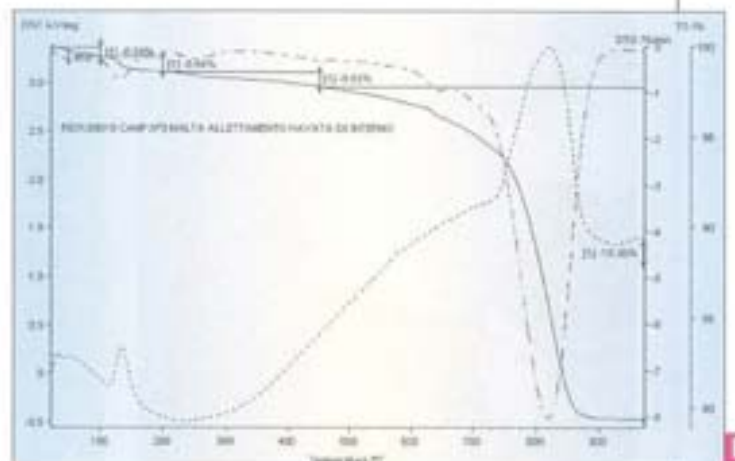
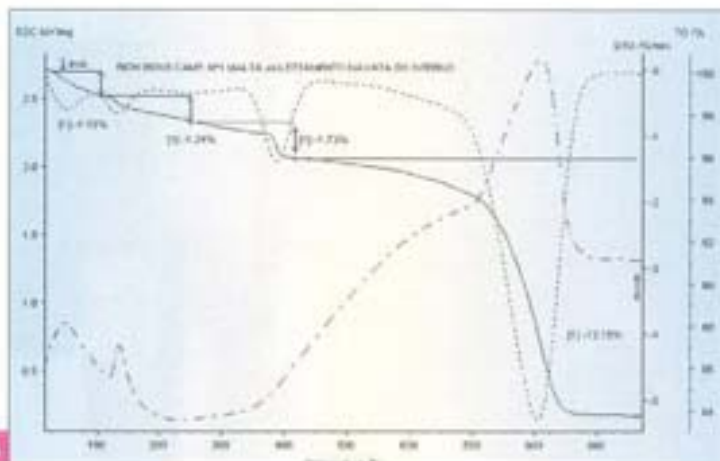


## RESTORATION OF THE BASILICA

Restoration of the Basilica of Sant'Apollinare Nuovo involved:

- restoration of the façade and the counter-façade, cleaning of the stone, consolidation of the mortar, and repair of the brick facing;
- dehumidifying, plastering and painting the side walls;
- restoration of the Baroque Saint Anthony Chapel;
- restoration of marble portals in the side chapels.





**A.** TG/DSC analysis of the brick mortar bed in the right-hand aisle revealed the amount of gypsum present, along with the amount of organic substances, lime and calcium carbonate contained in the mortar.

**B.** TG/DSC analysis of the brick mortar bed in the left-hand aisle.

1. The interior walls of the side aisles were badly decayed, as can be seen to the rear of the 6th-century pulpit.
2. The right-hand aisle where the plaster was separating from the underlying masonry because of rising damp.
3. Pointing the joints in the brick masonry with MAPE-ANTIQUE MC light-coloured dehumidifying mortar, formulated in the Mapei Research and Development Laboratories.

## Dehumidifying and plastering of the walls

The interior walls of the Basilica were in such an advanced state of decay that the repairs had to be performed by demolishing the old plaster, removing the mortar from the brick walls, washing down the surface and covering the walls with a vapour-permeable mortar inside the Basilica up to a height of two meters (except for some sections of the right-hand aisle where the original brick had been left exposed and only needed pointing).

### Right-hand aisle: the diagnosis

Tests made on samples of the mortar bed in the right-hand aisle of the Basilica showed that the mortar was composed of common lime (that had completely carbonated), mixed with siliceous aggregate, quartz, and sodium and potassium feldspar. The amount of gypsum found suggested it did not result from pollutants present in the atmosphere but that it was originally used to modify the plasticity of the mortar (a technique used in the past).

During restoration, the presence of the gypsum made it necessary to use a special technique based on technologically advanced material. Gypsum reacts with cement-based materials to form ettringite. Ettringite causes delamination of the strata and destroys the material.

### Left-hand aisle: the diagnosis

Here the analysis of samples from the mortar bed showed the mortar was composed of lime mixed with siliceous aggregate. X-ray diffraction revealed the presence of ettringite produced by the reaction between the free lime, gypsum, and clay present in the sand that was used in the plaster.

This suggests that in modern times the

masonry was touched up here and there with lime.

## Solutions

The lab results enabled Mapei to determine the test techniques to be used for the restoration of the Basilica. The MAPE-ANTIQUE system was used for the restoration. On both aisles a scratch coat of MAPE-ANTIQUE LC was applied. MAPE-ANTIQUE LC is a special cement-free, sulphate-resistant binder for macroporous renders.

MAPE-ANTIQUE MC was used for pointing the brick, part of which was left exposed. MAPE-ANTIQUE MC is a light-coloured dehumidifying mortar which is insensitive to aggressive agents. However, it has a degree of porosity, modulus of elasticity and mechanical strength similar





to those of antique lime-based mortars. MAPE-ANTIQUÉ FC, a pre-mixed ready to use fine grain sulphate-resistant mortar, was used to finish the renders. Using the MAPE-ANTIQUÉ system also enabled dimensional stability to be achieved in a short time because of the low level of lime present in the system. After only one week the concentration of lime was minimal, unlike normal binders in which the level of lime stays high for years.



4. Applying a coat of MAPE-ANTIQUÉ MC mortar which is insensitive to aggressive agents, yet has performance characteristics similar to those of antique lime-based mortars.

5. The right-hand aisle where a transpiring render was applied using the MAPE-ANTIQUÉ system.



## THE MOSAIC MUSEUM

Consolidation of the Mosaic Museum in the Theodoric Palace regarded:

- remodelling of the 16th century Rectory adjoining the Basilica with an entrance from the old cloister;
- consolidation of the columns and crowns of the cloister supporting the floor of the Museum;
- construction of a transpiring render up to approximately two metres high;
- consolidation of the floor of the Rectory;
- installation of an industrial floor in a Museum room.

### The 16th-century cloister

The cloister adjacent to the Basilica was built in the 16th century and supports the floor of the Mosaic Museum. The solid brick arches that rise from the cloister's stone columns were in need of structural consolidation and in need of a transpiring render on the wall adjoining the Mosaic Museum. A system developed in the Mapei Research and Development Laboratories was used for the consolidation. This tried and tested system consisted of injecting materials formulated with high-performance resins.

First the old plaster was demolished.



6. Detail of the metal tie rods reinforcing the arches of the cloister before the start of restoration.

7. One of the damaged arches of the 16th-century cloister. The statics of the structure, which supports the Mosaic Museum, were seriously jeopardised.

8. Coating the arch with MAPE-ANTIQUÉ MC mortar in order to contain the injection. Note the reinforcement rod treated with MAPEFER.

9. EPOJET being injected into the brick arch. This product is a super-fluid epoxy resin with extremely high performance characteristics.

10. After restoration, the arches of the 16th century cloister can support the weight of the floors.

11. The two-metre high transpiring render applied using MAPE-ANTIQUÉ MC + MAPE-ANTIQUÉ FC.

12. The same system was used in some rooms around the cloister. In this photo the private sacristy of the Archdiocese of Ravenna





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Ravenna and in the entrance of the Museum.

#### An unobtrusive floor

The Mosaic Museum houses the

13. The area dedicated to housing the Mosaic Museum and its 5th century mosaics prior to laying the new flooring. The surface will have a neutral, unobtrusive look so as not to distract from the mosaics on display.

14. ULTRAPLAN being applied over the TOPCEM screed. ULTRAPLAN is a fluid, cementitious self-levelling compound that dries ultra-fast and gives the screed a compact, even finish that will provide a perfect neutral surface for the Museum floor.

Then the damaged brick surface was soaked with water, saturating the cracks as well. The tie rods were given a protective coating of MAPEFER, a cementitious mortar with corrosion inhibitors for metal reinforcement. Then the bricks were coated with MAPE-ANTIQUE MC mortar in order to contain an injection of EPOJET through tubes. EPOJET is a super-fluid epoxy resin that is waterproof and polymerises without shrinkage. MAPE-ANTIQUE FC was used as a finishing.

The same system made up of MAPE-ANTIQUE MC + MAPE-ANTIQUE FC was used to construct a two metres high transpiring render on the wall of the cloister that supports the Mosaic Museum. The same system was used in the private sacristy of the Archdiocese of



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mosaic floors of the Theodoric Palace that date back to the 5th century A.D. The exhibit spaces required a very neutral type of floor that would not distract from the mosaics. A sheet of polythene was laid over the concrete slabs before placing a floating TOPCEM screed 5 to 6 cm thick over it. TOPCEM is a fast drying special,



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normal setting hydraulic binder. ULTRAPLAN, a fluid, cementitious self-levelling ultra-fast setting compound, was later poured over the screed. The hardened ULTRAPLAN was then treated with a wax finish.



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## BETWEEN THE BASILICA AND THE "THEODORIC PALACE"

Restoring the buildings located between the Basilica of Sant'Apollinare Nuovo and the "Theodoric Palace" involved:



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- conversion of the former Corso Cinema into a multi-purpose auditorium seating 180;
- remodelling the mezzanine into a conference room;
- construction of a visitors' welcome centre with a restaurant seating 120;
- construction of the Basilica bookshop;
- construction of living space for the Basilica custodian;
- installation of industrial flooring.

### The former Corso Cinema

The building that stands between the Basilica and the Theodoric Palace is the former Corso Cinema. Parts of its exterior



walls were badly decayed. Analysis revealed the composition of the original mortar which was now completely carbonated: 1 part gypsum, 1 part hydraulic lime and 3 parts inert silicas. Here, too, the presence of ethringite led Mapei to assume that there had been an attempt at restoring the building using antique materials in more recent times.

The new restoration was performed using a mortar with cement-free binders. A scratch coat of MAPE-ANTIQUE MC was applied, followed by a finishing coat of MAPE-ANTIQUE FC. The same system was used on the two metre high support columns and walls of the modern cloister.

### Industrial floors

In the last few years the use of



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15. The waxed ULTRAPLAN Mosaic Museum floor.



16. The exterior of the former Corso Cinema before restoration: the plaster was completely carbonated due to the presence of ethringite.

17. MAPE-ANTIQUE MC being finished with a coat of MAPE-ANTIQUE FC, a light-coloured, cement-free fine-grain mortar.



18. A new façade for the Holy Year: the external masonry walls face the Corso (main thoroughfare) and are plastered with MAPE-ANTIQUE MC + MAPE-ANTIQUE FC.

19. A detail of the arch in the modern cloister.

20. The modern entrance hall of the Mosaic Museum with its unobtrusive floor.

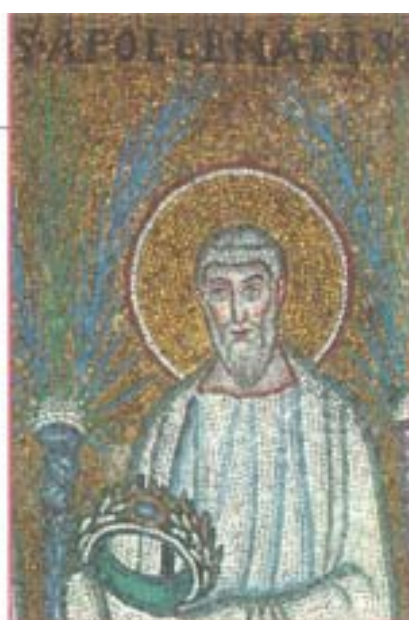
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industrial flooring in buildings and especially in show rooms has become a fast growing phenomena if not a fad. The system TOPCEM+ULTRAPLAN was used because of its excellent practicality, quality, and aesthetic effect and was used for the floors of a room in the Mosaic Museum and in different areas between the Basilica and the Theodoric Palace. The areas restored with this system are the entrance hall, the multi-purpose auditorium, the visitors' welcome centre, the restaurant and the management offices.

Graphs made by: Milan Research and Development Laboratory - Tiziano Cerulli  
Photographs 12, 15 and 20: Paolo Radi



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## TECHNICAL DATA

Sant'Apollinare Nuovo - Ravenna (Italy)

Year Built:

Basilica: 493-526

Mosaic Museum: 16th century

Former Corso Cinema: 20th century

Restored: 1999

Commissioned by: The Archdiocese of Ravenna and Cervia

Supervised by: The Superintendence of Environmental and Architectural Resources of Ravenna

Artistic Supervision: Dr. Roberto Evangelisti, Arch.

Project Manager: Dr. Massimo Bagnoli, Arch.

General Contractor: Consorzio Ravennate Cooperative di Produzione e Lavoro

Contractor: Cooperativa Ediltecnica of Ravenna - Eng. Paolo Cicognani - Frediana Morganti - Arch. Cristina Garavelli

Site Supervisor: Davide Bubani (qualified surveyor)

Mapei Products used:

in the Basilica (zone A):

MAPE-ANTIQUE MC

MAPE-ANTIQUE LC

MAPE-ANTIQUE FC

In the Mosaic Museum (zone B):

MAPE-ANTIQUE MC

MAPE-ANTIQUE FC

MAPEFER

EPOJET

TOPCEM

ULTRAPLAN

For the former Corso Cinema (zone C):

MAPE-ANTIQUE MC

MAPE-ANTIQUE FC

TOPCEM

ULTRAPLAN

Mapei coordinators:

Dario Turci, Fabio Costanzi, Paolo Sala

Technical data sheets for the products mentioned in this article are available in the following Mapei binders: No. 1 "Ceramic Tile Installation Products", and No. 3 "Building Specialty Line".



# POLYMERS IN SWITZERLAND

Mapei has acquired a factory in Fribourg, the Swiss Canton famous for its gruyère cheese, that will supply redispersible powders to the Group's European production sites, and where all the activities of Mapei Suisse are now concentrated.



Mapei is increasing its presence in Switzerland. The Italian multinational has, in fact, purchased a factory in the Fribourg Canton in the western part of Switzerland. To be more precise, in the region famous for its prestigious cheese: Gruyère. The plant is in Sorens, north of Lake Geneva, 40 km from Bern.

"It is in a strategic position," affirms Veronica Squinzi, controller of the multinational "as it will supply redispersible

powders to all the European plants of the Mapei Group, including factories in Italy, Austria, France, Spain and Germany. The plant in Soren will be supplied by the Vinavil plant in Villadossola, on the Italian side of the Simplon Pass."

Lucian Longhetti, director of strategic planning for the Mapei Group adds, "The acquisition of the plant in Sorens is a further step in the implementation of the Group's vertical growth strategy.

In-house production of strategic raw materials allows us, on one hand, to

optimise the quality of the materials for the final application, thus guaranteeing high levels of quality, and on the other, to optimise production costs, bringing



competitive advantages and direct benefits for customers."

One of the Group's first initiatives in the direction of vertically integrating its production potential came with the acquisition of Vinavil, the biggest Italian manufacturer and one of the most important European producers of poly-vinyl-acetate emulsions in 1994. Previously, what was missing in the production of poly-vinyl emulsions was a plant capable of transforming these emulsions into powders. This void is now filled by the plant in Sorens allowing Mapei to better exploit the advantages and potentials of vertical consolidation. Following the acquisition of the Swiss plant, Mapei is now the only Group in the world that produces cement adhesives integrated with redispersible powders.





The new plant and the  
headquarter of  
MAPEI SUISSA SA  
in Sorens



Thanks to the work carried out in the Group's research centres (Vinavil concentrates on the synthesis of polymers while Mapei concentrates on powder and additive technology), Mapei has been able to develop innovative processes that guarantee exclusive levels of performance and quality.

It took eight months to conclude negotiations for the Sorens factory which has been fully operative since September with 20 employees, and the number of workers looks set to increase in the future. Mapei has decided to invest ITL 10 billion over the next three years to increase production capacity and to bring the plant up to international standards with regards to safety and environmental issues. The factory was acquired through Mapei Polymeres Suisse, a subsidiary company headed by Giorgio

Squinzi. Now Mapei's commercial activities in Switzerland are centralised in this company.

Switzerland has, in fact, always been a very important market for Mapei. Since the beginning of the 1960s Mapei



products have been widely available thanks to exclusive distributors such as Valli AG and Mapebeton in the Ticino Canton. In addition, a new reality became operative in 1995 - Mapei AG, with its headquarters in Rotkreuz (Zugo) and offices in Bussigny (Vaud). All activities now are concentrated in the new company, MAPEI SUISSA SA.



# SAN CARLINO ON THE WATER

A section of the church built in Rome in the 17th century by the Borromini family was reconstructed on Lake Lugano. The section of the church was based on the project of the architect, Mario Botta, and sponsored by Mapei.



PHOTO 1

A section of the church of San Carlo alle Quattro Fontane, the first master-piece by Francesco Borromini who lived in the 17th century Rome (photo 1) has been reproduced in all its spectacular beauty. Thanks to Mapei's sponsorship this model, designed by the architect Mario Botta, was built on Lake Lugano in the Ticino Canton, not far from the Italian border, and stands nearly 33 metres high and weighs 90 tons. The model was built in occasion of the 400th anniversary of Borromini (born on September 27, 1599 in Bissone, a town near the lake) and the exhibition organised by the Canton Art Museum of Lugano.

The wooden San Carlino is built on a 22x22 metre platform placed a couple of metres from the lake shore. The model is made up of overlapping 5 cm thick red fir planks assembled with the interposition of a staff bead. The skeleton of the model is made up of a special 15-metre high tubular steel structure anchored to the floating platform. The external covering of the structure is made up of wooden planks

like those of the model itself. The dome and lantern in section appear above the skirt that hides the internal structure.

Borromini, whose real name was Francesco Castelli, was trained as a stone cutter at the Fabbrica del Duomo (the construction of the Duomo) of Milan. He later went to Rome where, starting in 1619, he collaborated on the Fabbrica di S. Pietro (the construction of the Basilica of St. Peter's) and dedicated himself to the study of ancient architecture and to the creations of Michelangelo, who became his inspiration.

The church of San Carlo alle Quattro Fontane was built between 1634 and 1667. The wooden model that now rises over Lake Lugano

facing the Tell bank was built thanks to an employment program that was especially studied by the Italian Swiss University and the architectural academy of Mendrisio. The whole event and the construction of the huge model, which took a few months, created jobs for many unemployed architects, designers, carpenters and artisans. The construction of the wooden San Carlino was possible thanks to the Mapei's sponsorship.

The question that arises is how come Mapei, known world-wide for constructions of "real" buildings, sponsored the "fake" reconstruction of an existing church? For several reasons.

First, because Mapei is known as the world-wide leader for adhesives in the building sector and wanted to participate in the celebration of Borromini's anniversary with a completely unusual project. In fact, the idea of constructing a massive wooden model is highly unusual.

Second, because the design for the wooden San Carlino was by Mario Botta. Botta has a long history of collaboration with Mapei due to the nine years it took to get planning permission to expand the Robbiano di Mediglia plant (on the outskirts of Milan) to a design by Botta, a project that started in the 1980s and was to see it become one of Group's biggest factories.

The third and last reason is because of the ties the Italian multinational has with

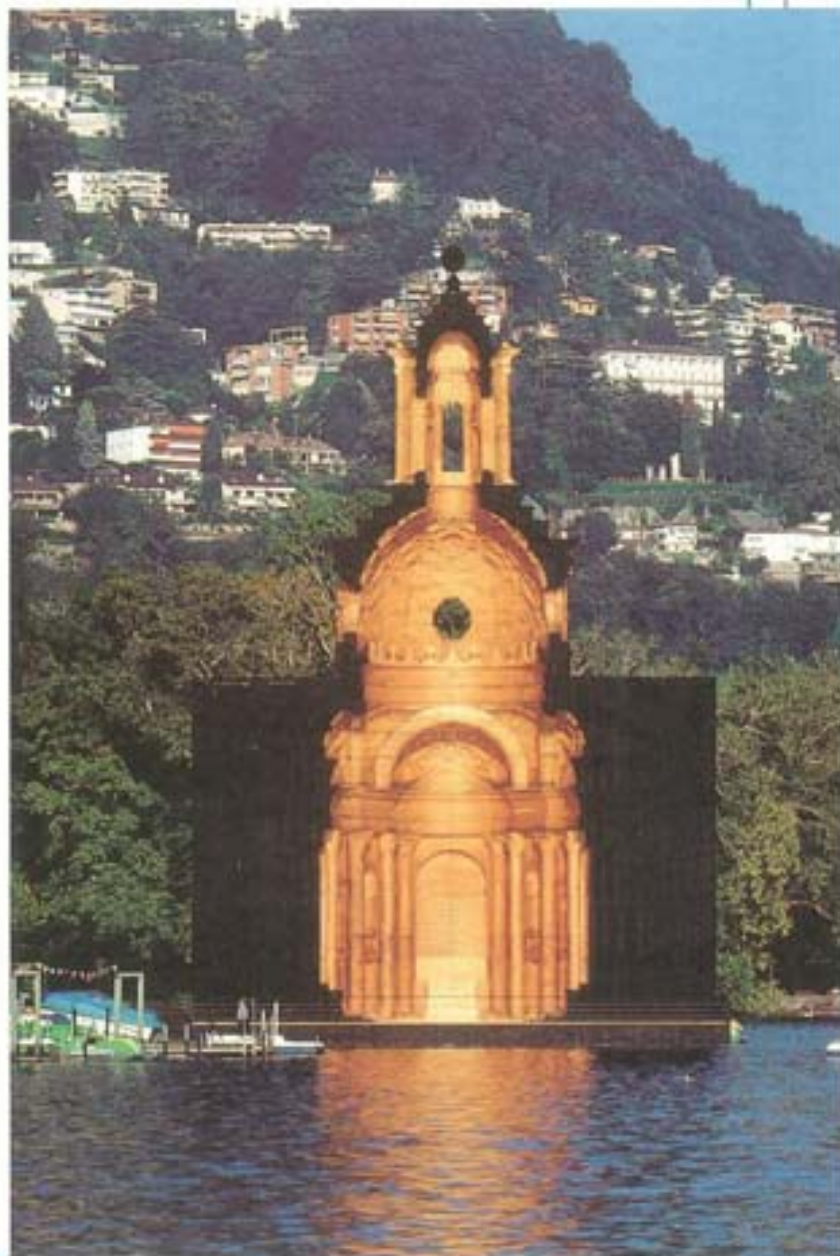
Switzerland and in particular with the Ticino Canton. In fact, the relationship dates back to the 1960s with the widespread distribution of Mapei products.

Today Mapei products are used in the most prestigious Swiss building sites including the Geneva tunnel, the Lucerne bypass, the Rolex plant in Bienna, the Migros

supermarket in Bern, the Telecom tower of Winterthur, the train stations of Zürich and St. Gallen, and the Melide dam. Mapei's bond with Switzerland is now even stronger since the acquisition of a production plant in Sorens, in the western part of the country and the organization of MAPEI SUISSE SA in Sorens.

## 33 meters above the Lake Lugano

The wooden San Carlino, the life-size cross-section of the church of San Carlo alle Quattro Fontane – Borromini's first masterpiece of the 17th century Rome - stands almost 33 metres high. It is made up of 35,000 4.5 cm thick planks assembled modularly with a 1 cm grout and joined up by steel cables. These cables are in turn bolted to the steel support structure which weighs 90 tons. The San Carlino model is set on a 22x22 metre platform. The wooden San Carlino emerges out of the mountainous landscape of the deepest inlet of the gulf and is a striking way of calling attention to the exhibition dedicated to Borromini early works. The model is only few metres from the shore, at the end of the lake promenade at the entrance to the Ciani park.



# TAKING SHELTER IN THE

The renovation work on the out-fitting wharf at the Sestri Ponente shipyard testifies to how an analysis of the conditions causing deterioration of concrete and choosing specific products are vital in re-establish quality and durability.

The Sestri shipyard is an industrial structure for the design and construction of oil rigs and ocean-going tankers. The shipyard covers an area of 213,000 m<sup>2</sup>, with 108,500 m<sup>2</sup> of state-owned waterfront leased by the Harbour Master Office of Genoa. Like other shipyards belonging to the Fincantieri Group, it has a world-wide reputation for its production capacity and for its skilled and experienced workers.

The state concession requires the company to look after the conservation and maintenance of the constructions around the bay, including the quays and a ship out-fitting wharf. Once the steel sheet hull of the ship is built and the sections are pre-assembled ashore, the ships are then assembled in dry docks before being fitted out and equipped for sea testing before delivery.

Today's particular market conditions mean that the yard has to undertake numerous orders simultaneously which, in turn, means locking up resources and manpower for years at a time. Such efforts require maximum organisation and highly efficient facilities.

## A race.... towards testing

Continual maintenance is necessary to prevent problems from arising that could slow production. Such maintenance is necessary because of the vicinity of the sea - in other words, the constant exposure to aggressive environmental conditions - as well as the wear and tear on the structures that have to bear the loads of cranes moving to and fro along the wharf. The out-fitting wharf is subject to most wear because of constant contact with water as well as the ships docked alongside.

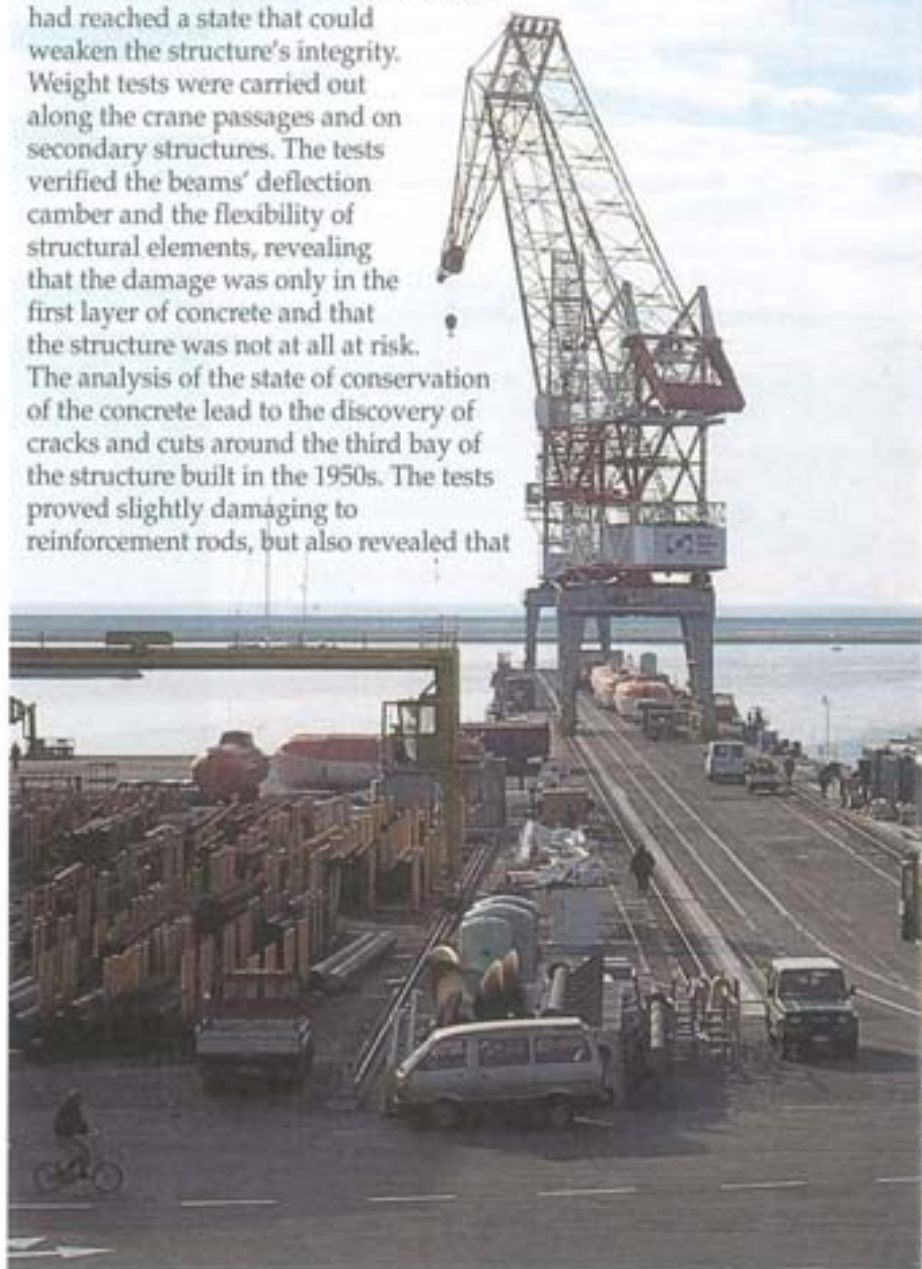
Two thirds of the structure was built in the 1950s while the last part, further out to sea, was added in the 1970s. It is 18 metres wide and 300 metres long. The main structure is composed of a pier on

which eight huge beams rest. The beams adjacent to the passage of the crane are 60 cm wide and 215 cm high. The concrete slab and external stemming form an box-like structure for wiring and piping which can be inspected.

Over the years, certain areas of concrete in the structure have showed signs of deterioration especially in the extension built in the 1970s. The amount of damage differed depending on the area, position and exposure to salt-water erosion. The shipyard's technical department therefore decided to test areas and evaluate if the level of deterioration

had reached a state that could weaken the structure's integrity. Weight tests were carried out along the crane passages and on secondary structures. The tests verified the beams' deflection camber and the flexibility of structural elements, revealing that the damage was only in the first layer of concrete and that the structure was not at all at risk.

The analysis of the state of conservation of the concrete lead to the discovery of cracks and cuts around the third bay of the structure built in the 1950s. The tests proved slightly damaging to reinforcement rods, but also revealed that



# DOCK



inspections to see the amount of deterioration had already been made in the past.

## Concrete at sea

Constructions directly in contact with salt water are more subject to deterioration which, if not detected or dealt with in time, could create serious and irreversible damage. The European law ENV 206, known as UNI 9858 in Italy, prescribes that only Class 4 concrete can be used for constructions built near or by the sea, under water, partially submerged or those built near the coast where they are exposed to the so-called "saline fogs".

Sea water deteriorates concrete mostly through the presence of sulphates which react with the cement causing the formation of ettringite. Chlorides are very aggressive when in contact with reinforced rods which, if they are not well protected by the cortical layer of concrete, corrode very rapidly. These factors must be taken into consideration when repairing structures in marine environments. The products used must be highly resistant to penetration of dangerous salts with the goal of re-establishing the necessary protection for durability.

## Cortical restoration of concrete

The state of conservation of the outfitting wharf varied from one area to another. The worst hit was the concrete slab which was devoid of damp-proofing and was covered with porphyry flooring. Other parts of the structure were also affected as could be seen by cracks in the cortical layer of the concrete. During the initial discovery phase the engineers noticed a considerable difference in quality of the cover of the reinforcing rods (and quality of the casting itself) between the structure built in the 1950s and that built in the 1970s. The 1950s' structure was

considerably better built. In both cases though, the inner surface of the girders and the concrete slabs were in bad condition. The concrete reinforcement rods were completely exposed and corrosion had reduced the section substantially (photo 1 and 2).

After having thoroughly analysed the problem and laid down all the parameters for the reconstruction project, the technical department decided to remove the layer affected by hydrodemolition in order to remove the chlorides that had penetrated the concrete over the years. The task called for a two-pronged approach: first, the removal of loose and deteriorated parts with electrodemolishers, second, high pressure hydroscaring (2,000 bar, 25 litres per minute) all surfaces. The use of high pressure hydrodemolition was especially

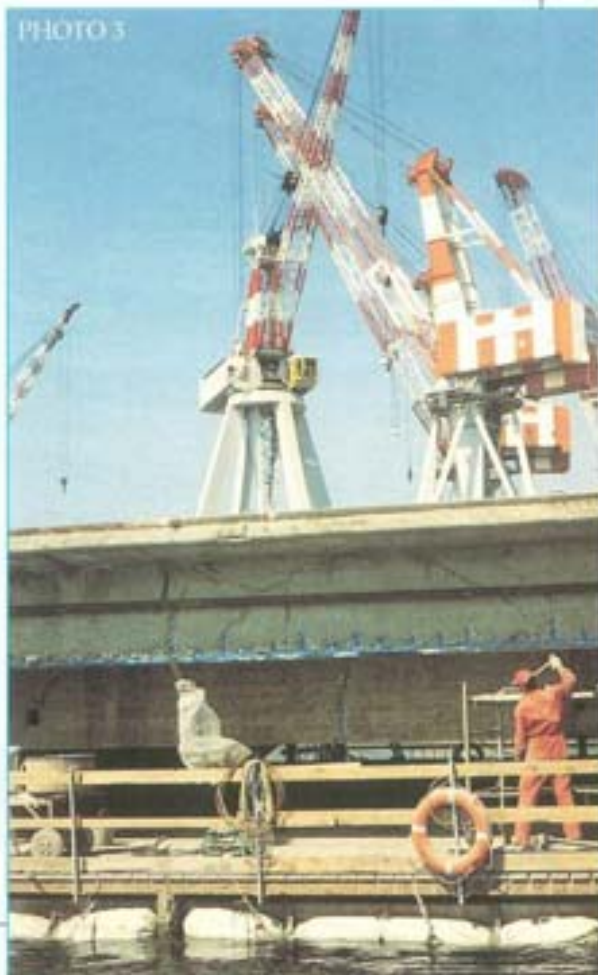




PHOTO 4

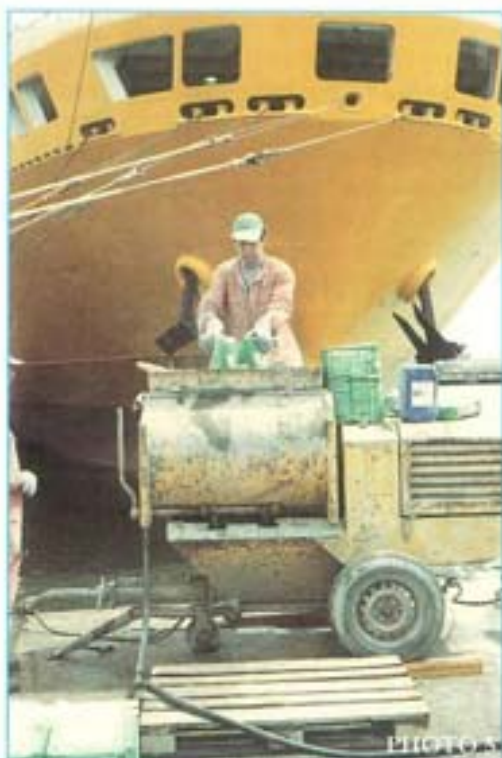


PHOTO 5

effective in some sections of the beams' inner surfaces. It revealed a higher degree of deterioration than expected, and fragments of concrete 7-8 cm thick were removed, exposing the steel reinforced framework.

**Seawater resistant materials**

The materials and application methods employed heavily influence the quality and durability of this kind of repair works. The rate of deterioration of concrete that has been repaired depends on how the new material bonds with both the reinforcement framework and the existing concrete, its strength, reduced shrinkage during the curing stage and waterproof characteristics of the concrete used. Beside these indispensable qualities, the materials employed must ensure good plasticity in a wide range of temperatures. This last property is particularly important when considering the environment in which the repair work is undertaken and the different types of surfaces encountered. Not all the surfaces are smooth and flat, but most are highly irregular calling for differing thicknesses to be applied.



PHOTO 6



PHOTO 7

After a careful analysis of the problem, the technical department and contractor decided that the best results would be achieved with three products. Each product would fulfill a particular requirement and would guarantee quality concrete, and increase its

#### TECHNICAL DATA FOR MAPELASTIC

<i>Adhesion to concrete:</i>	0.8 N/mm <sup>2</sup> (cohesive break of the product)
<i>Modulus of elasticity:</i>	480 N/mm <sup>2</sup> (after 28 days at 23°C)
<i>Positive Waterproof:</i>	limited to 3 atm positive push (DIN 1048) limited to 1 atm negative push (DIN 1048)
<i>Water permeability:</i>	absent at 1 atm (UNI 8202 - point 21)
<i>Resistance to vapour (µ):</i>	1,500
<i>Resistance to freeze/thaw cycles on concrete:</i>	more than 300 cycles (UNI 7087)
<i>Flexibility tests on ties:</i>	25.5% (DIN 53504 modified)
<i>Crack-bridging tests:</i>	cracks more than 1mm (Austrian recommendation RVS)
<i>Resistance to calcium chloride (after 60 days in 30% CaCl<sub>2</sub> solution):</i>	loss of compressive strength on a sample protected with MAPELASTIC - none
<i>Resistance to sodium chloride (after 60 days in 10% NaCl solution):</i>	NaCl < 2 mm ion penetration
<i>Resistance against carbonisation (after 60 days in 30% CO<sub>2</sub> solution):</i>	penetration of carbonisation < 2.5 mm

PHOTO 8



durability.

MAPEFER - a mortar based on polymers in water dispersion, cement binders and corrosion inhibitors - was brushed on the reinforcing rods (photo 3 and 4). Besides being an effective corrosion inhibitor, MAPEFER also improves adhesion of the concrete. The concrete was then reconstructed using MAPEGROUT MS, a pre-mixed micro-silicate-based fibre-reinforced thixotropic mortar (photo 5, 6, and 7).

MAPEGROUT MS is composed of high-strength cements, special additives with pozzolanic action (needed to provide the durability required), selected aggregates and synthetic fibres. In areas where thicknesses over 4 cm were necessary, gravel was added and extra reinforcing rods were placed in those areas most subject to deterioration.

MAPELASTIC - a two-component plastic cement - was used to coat the entire structure including those areas where concrete was in good condition with a layer just millimetres thick for complete protection (photo 8). Once dry, the MAPELASTIC gave the surface a good-quality finish that is completely impermeable to carbon dioxide, chloride, and sulphates.

In some areas unaffected by deterioration of the concrete such as, for example parts of the pier where hydroscarified surfaces were particularly irregular and covered with pits 1-2 cm deep, MAPEGROUT MS had to be

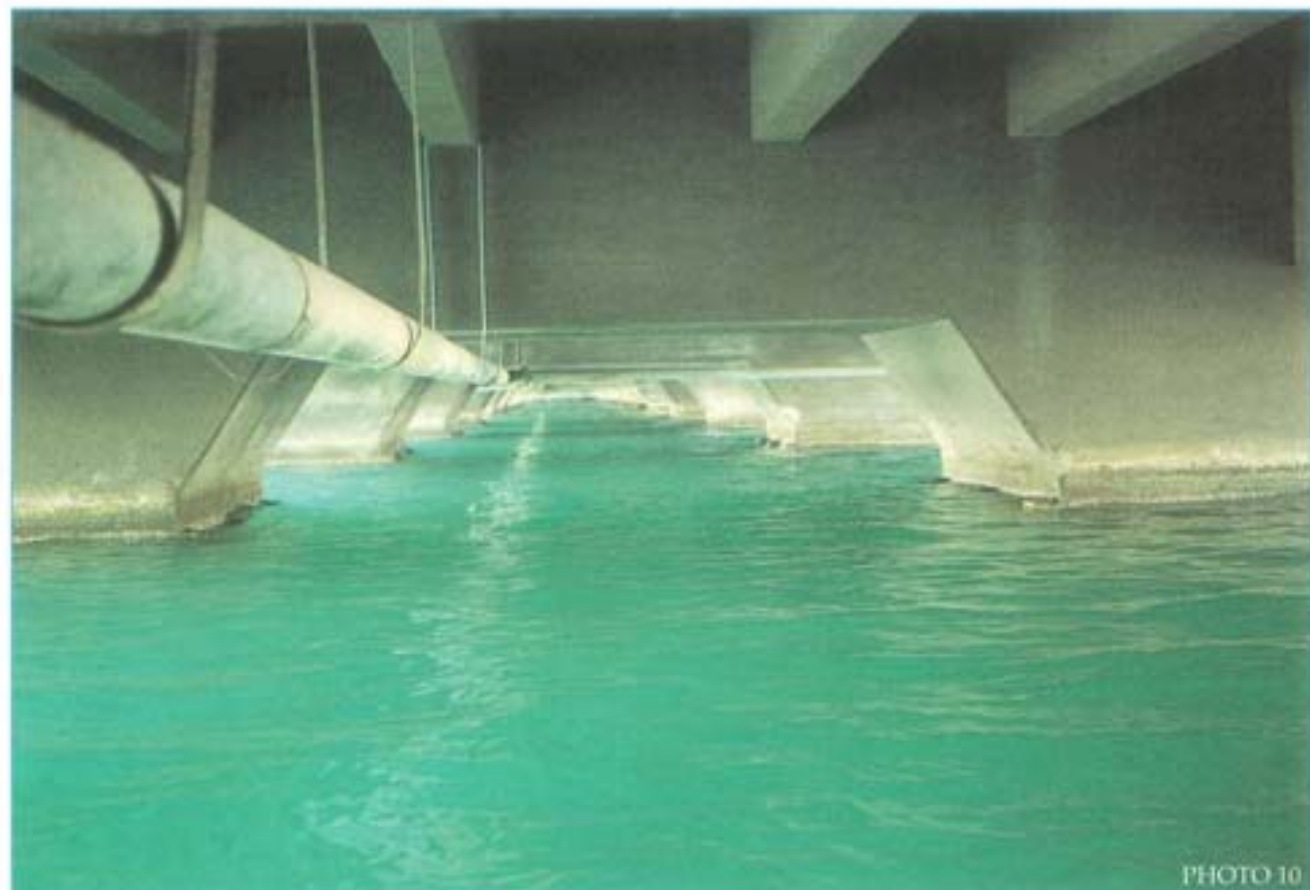


PHOTO 10

applied before the MAPELASTIC in order to level the surface of the hydroscarified concrete. Applying MAPELASTIC alone would have meant forming layers too thick for a product designed to be only millimetres thick.

#### Structural reinforcement by cladding

During repair, the technicians discovered that the stability at the intersection between the dock and the out-fitting wharf was very precarious. This point was almost inaccessible because the gap between the water surface and the inner surfaces of the three scaffolding beams was only 50 cm. As the bays couldn't be reached from the side or from below, access hatches were built to inspect for possible cracks in the beams and to repair the concrete where necessary. Inspection revealed vertical cracks along the 3 metre high, 10 metre long and 80 metre thick beams around the supports. Repair called for reinforced structural cladding made from three 10 mm layers of sheet iron. The sheet iron was first sandblasted and then bonded to the beams with ADESILEX PG1, a thixotropic epoxy adhesive for structural bonding. The iron cladding effectively substituted the concrete's iron reinforcement rods which had proved

insufficient in sustaining the work loads. To render the cladding even more structural, holes were drilled through the girders and threaded rods inserted and bolted at either end. MAPELASTIC was then applied to the whole structure.

Now the out-fitting wharf can be considered virtually bomb-proof (photo 10).



#### TECHNICAL DATA

Sestri Cantiere navale, Gruppo Fincantieri  
Sestri Ponente (GE)

Year Built: 1950s and 1970s

Year Repaired: 1998

Structural Manager: Eng. Donatella Mascia

Project Manager: Renato Manara

Contractor: Mosconi Srl. - Edolo (Brescia)

Mapei Products used for repairing the concrete:

MAPEFER  
MAPEGROUT MS  
MAPELASTIC  
ADESILEX PG1

Mapei coordinator: Eng. Fulvio Bianchi

*We would like to thank the magazine "Costruzioni Due" which supplied some sections of the text for this article.*

*The Technical Data Sheet for the products mentioned in this article are contained in Mapei binder No. 3, "Building Speciality Line".*





Florida Power Corporation's "Sunsation!" is the 10x275 pedestrian promenade at the entrance to Tropicana Field, Home of the Tampa Bay Devil Rays baseball team. Florida Power Corporation (FPC) approached the landscape architect, Phil Graham Fasla of Phil Graham & Co., P.A., St. Petersburg, Florida, to upgrade the existing run-down walkway as part of the company's sponsorship of the Devil Rays. Upon review of the site, the landscape architect suggested that FPC do more than "upgrade" and instead construct a high-focal, "showplace" entrance which would be a long-term asset to the stadium and to the community. FPC was enthusiastic about the proposed concept and contracted with Phil Graham to design and oversee construction of the \$1.3 million project.

#### The American tropics

A tropical theme was developed featuring original art, exuberant use of colour, a state-of-the-art outdoor sound system, exciting theatrical lighting effects and dramatic landscape. Sunsation showcases one of the largest mosaic tile murals in the world.

Phil Graham contacted Hank Hilton, President of Ceramic Solutions, Tampa, Florida, the local American Olean Tile distributor, on the mechanics of the ceramic tile design for this project.

A 5 m wide inset of the sidewalk is covered with a mural consisting of over



SUNSATION



two million pieces (approximately 1,200 m<sup>2</sup>) of America Olean 2.5x2.5 cm ceramic tiles installed showing sea life, beach scenes, waves and a dramatic sunburst depicting FPC's logo which consists of 54 circles with hundreds of fibre optics made of 2 cm Corian within a tile sunburst.

A completion deadline of March 15, 1998 was established. This was the first game of the inaugural season for the Tampa Bay Devil Rays.

### Hurricane-proof

In early October of 1997, Phil Graham contacted Frank Canto, President of Craig Tile, Inc., St. Petersburg, Florida. Having worked together previously on many high profile projects, he selected Craig Tile for the installation because he recognised the importance of a professional tile installation. It was critical for the success of this project that the tile withstand the exposure to the harsh Florida sun, to rain and thermal shock. Ironically, the design theme was based on the Florida attractions of sun and water.

In mid-October 1997, the General Contractor, Hennessy Construction Services of St. Petersburg, Florida, was selected and Jim Williams was named Project Manager. He put together a critical path method schedule, began to coordinate the different sub trades and also began the task of demolishing the existing concrete sidewalk and starting to form/pour the new concrete structure that would be totally designed around the ceramic tile mosaic surface.

Also in mid October, Frank Canto contacted one of the country's leading experts in tile installation, Robert Young of Ceramic Tile & Marble Consultants, Oklahoma City, Oklahoma. Mr. Canto described the project to him and asked "Who makes the best thin-set mortar?" Mr. Young said he was impressed with the performance of Mapei's GRANI/RAPID\*.

### The project

Frank Canto then contacted Craig Hamilton, Director of Technical Services with Mapei Corp. (USA) and, after many phone conferences, it was decided that the best method of installation in this environment would be a "thin-set"



installation with GRANI/RAPID\*, a two-component adhesive system with rapid setting and hydration that bonds directly to the concrete slab in lieu of a "thick-set" (mud) installation. Mr. Hamilton also worked to specify the requirements for the concrete installations addressing compaction of the subgrade, wire reinforcing, slump, thickness, finish, expansion joint location and curing requirements.

### Credit comes with time

In December of 1997 Phil Graham and his wife and office manager Stephanie, who was also an integral part of the tile design, initially travelled to American Olean's factory in Olean, New York, and met with Paul Brown, Design Manager. Drawings were then sent back and forth between Florida and New York before the different panels were finalised.

By mid-January 1998, Craig Tile had set up six 6x6 m tents on the west side of the first poured sections of concrete. They were used to keep it cool, dry and clean prior to tile installation. The free form wave pattern curvatures were laid out with PVC piping.

Craig Tile determined, due to the industry recommended 20x20 mm knotted trowel size to install 2.5x2.5 cm tile, the GRANI/RAPID\* bonding mortar would also become the grouting between the tiles. This would provide more of a mechanical bond than the standard procedure of a separate portland cement grout.

At the end of January, the first of the mural panels began to arrive. Each panel measured 3.70x4.90 m and consisted of 96



sections of 2.5x5 cm tile sheets. Each sheet was numbered to correspond with an overall tile layout.

In mid February 1998, Craig Tile received the final sunburst pattern design. One of the most challenging aspects of this job is to incorporate 54 corian circles with the need for fibre optics to feed from under the slab and then to flush with surrounding 2.5x2.5 cm tiles. Craig Tile decided a substrate of two layers of 20 mm thick corian (overall 40 mm thick) could be routed more precisely than forming the concrete for the critical dimensions needed for the corian circles. A template was then made and sent to American Olean's Design Department to waterjet the circles. Tile was installed with Mapei's PLANICRETE W\*, a urethane adhesive, over the corian panel.

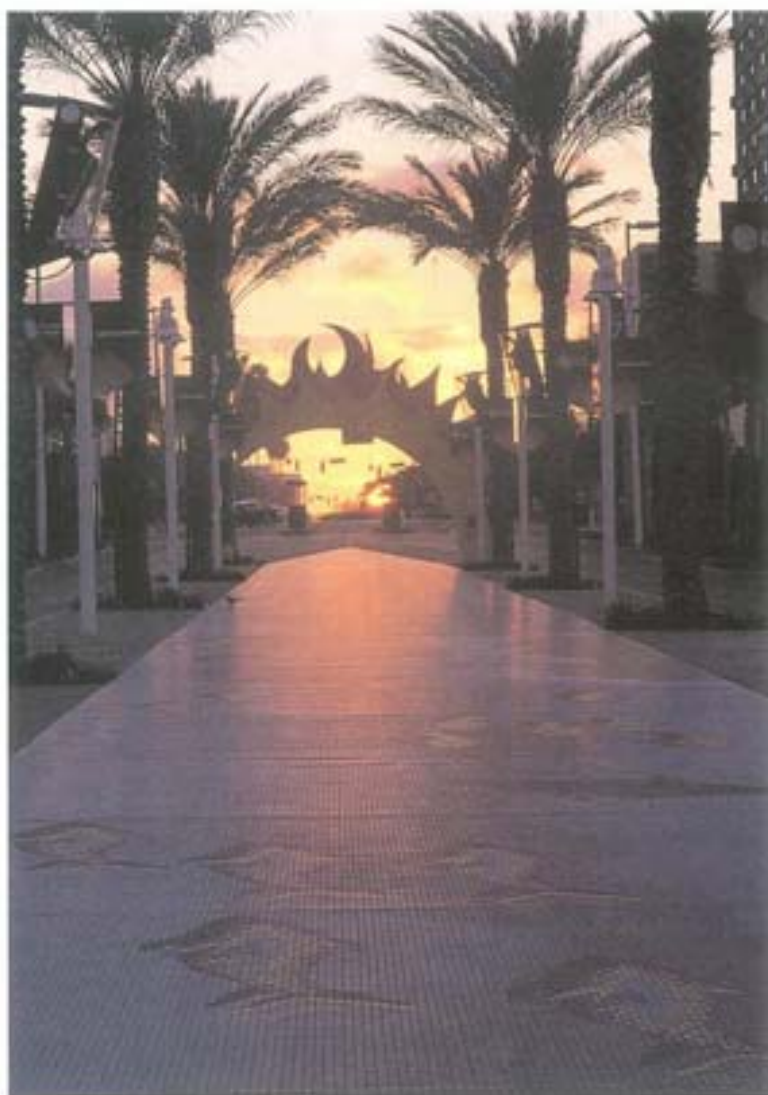
Tony Tavernese, General Superintendent for Craig Tile, coordinated all tile shipments and the installation, installing the panels faster than American Olean could assemble and ship to Florida. However, working several overtime shifts, American Olean was able to get all the panels shipped in time for Craig Tile to finish the installation just a few days prior to opening day.

### Laser light dream

At night laser lights mounted in the surrounding palm trees move across the seascape as if magically bringing the water and sea life alive. Synchronised music with the laser lights and fibre optics have transformed Sunsation into a year round attraction for tourists and Tampa Bay residents alike.

Sunsation was one of those rare projects we all see periodically in our careers. At some of our first coordination meetings with the architect, general contractor, tile supplier and tile contractor, there was an atmosphere of professionals working together to create something really unique. It was one of those extraordinary projects where we develop friendships and respect for each other along the way. This exceptional atmosphere made this project a real success! This was definitely a "team effort" and one of those "once in a lifetime" projects that has become a source of great pride.

by Joe Richardson  
President of FPC



### TECHNICAL DATA

Sunsation-Tropicana Stadium - St. Petersburg, Florida (USA)

Built: 1997-1998

Commissioned by: Florida Power Corporation (FPC)

Architect: Phil Graham FASLA-Phil Graham & Co.P.A., St. Petersburg, Florida

Contractors: Hennessey Construction Services - St. Petersburg

Installed by: Craig Tile Inc. - St. Petersburg

Materials used: American Olean 2.5x2.5 cm ceramic mosaic tiles

Local distributor: Ceramic Solutions - Tampa, Florida

Mapei products used to install the mosaics:  
GRANI/RAPID\*  
PLANICRETE W\*

Mapei coordinator: Craig Hamilton - Mapei Corp.

\*These products are manufactured by Mapei Corp. (USA)



# The Abbey of Tiglieto

Italy's first Cistercian settlement has been subject to careful architectural restoration which had been carried out respecting the appearance of the original building.

Over the centuries, the abbey of Santa Maria di Tiglieto has undergone numerous transformations and has often been tampered with. Built by white monks from France at the beginning of 1120, the abbey is situated on a plain inland of Genoa surrounded by thick forest. The abbey was the first Cistercian structure to be built outside Burgundy. The region in which the abbey was founded - Selva dell'Orba (meaning "Orba wood" after the river) - was, and still is, wrapped in the silence of the mountains; ideal conditions given the community's solitude yet, at the same time, it was not far from important communication routes with Genoa and Savona.

The church is laid out like a basilica with three naves, with the apse orientated towards the east, and a non-protruding transept. In the 13th century the layout was modified by extending the church

towards the west and adding two bays. In the 17th century the church was completely transformed by various interventions; the reversal of its orientation (west apse), construction of a new front façade to the east, construction of a belfry over the transept, the lowering of the transept's arches, and the construction of a barrel vault over the nave and cross vaults over the side aisles. Subsequent superfluous additions in the side aisles during the 1800s further modified the exterior aspect of the abbey. Finally in the 1950s and 1960s, radical restorations was undertaken. Some parts were demolished while others reconstructed in the hope of restoring the building's original appearance.

## Complex structural stability

This brief descriptive historical summary of the building explains how,

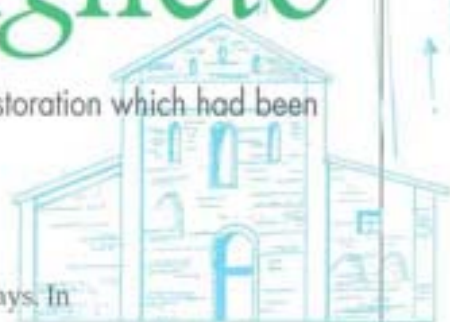


PHOTO 1



during the course of the centuries, the structural stability of the construction has been completely altered, weakening some parts, introducing pressure and greater stress on others while, at the same time, reducing or removing structural links between various masonry elements (photo 1). In other words the architects were faced with a series of disconnected elements that could not support each other's loads and thrusts or withstand possible subsidence in the foundations.

These fundamental problems had to be taken into



when the building passed into the hands of the Raggi family, is made up of ribbed brickwork approximately 15 cm thick. There was widespread cracking throughout the vault which risked putting the whole structure out of balance. The bearing wall's foundations has probably subsided causing the vaults to deform, increasing the eccentricity of the crown and creating stress on the extrados. Since the walls have very low resistance to tensile stress, cracks opened along the intrados keystone (photo 2).

Restructuring involved the construction of a thin reinforced concrete shell on the extrados of the vault, the erection of new support walls (in reinforced concrete) and the installation of a double series of support ties to efficiently resist the thrust of the vault on the side walls. This

extremely delicate procedure called for a precise plan of action.

PHOTO 3



### A new shell

The construction of a cover over the extrados required a series of highly sophisticated technical approaches. First of all, after having erected a structural steel scaffolding above and below the nave able to support its whole weight (photos 3 and 4), the cracks in the vault were sealed. MAPEANTIQUE MC, a pre-mixed sulphate-resistant mortar for the restoration of historic buildings was used to repair the cracks from the intrados of the vault. The extrados was then thoroughly cleaned using compressed air (photo 5). The new shell was then constructed over it and supported by beams using the side walls that had already been reinforced.

consideration during restoration, favouring solutions that could restore the links between the various structural elements. Special attention was paid to reconstructing the roof. Preliminary inspections were made on the building's general structural state, identifying the most urgent interventions needed to give the building the necessary level of structural safety.

### An unstable vault

The nave's round vault which was built in the 1600s



The reinforced vaulting was made using STABILCEM (photo 6), an expanding cement binder used instead of normal cement, which then adhered to the vault. STABILCEM is a high quality concrete with high compressive strength after only a short period of time (23.70 N/mm<sup>2</sup> after one day).

To be sure that the new structure solidly supported the vault, 2,000 holes were made in the extrados of the vaults to take iron support tie rods and, lastly, a layer of cement modified with PLANICRETE - a synthetic-rubber latex that improves cement slurries' adhesive characteristics and resistance to flex - was spread. The tie rod brackets were structurally anchored by injecting EPORIP, an epoxy-based resin that cures without shrinkage and has excellent dielectric and high mechanical resistance properties.

#### A resinous wood

The wooden roofing is made up of flint



PHOTO 6

seriously damaged (photo 7 and 8).

The temporary removal of the wooden roofing was necessary for the reconstruction of the vault. This revealed the state of conservation of the trusses. Since some of the trusses were either rotten or missing, the Project Managers decided to reconstruct or insert new sections where required to recreate the original geometrical form of the roof (photo 9).

After verifying the compatibility with the wood, EPORIP was poured into a mould around the trusses and reinforced with stainless steel. The trusses were then covered with a roof similar to the original.

#### A delicate intervention

The analysis of the Tiglieto church revealed its importance as a monument of great historic-artistic prestige and as a rare example of the Cistercian spirit and life-style. The restoration of the church



PHOTO 7



PHOTO 8

laggings, 18x36x2.5 cm tiling similar to the original scandola oak or chestnut tiles. Before restoration, the roofing was in an advanced stage of deterioration.

The pitches had numerous cracks where water and snow penetrated causing further damage to the already precarious structure. The massive wooden frame of the roof composed of chestnut truss and beams was also

was carried out under extremely rigorous historical control and was backed up by considerable technical and scientific competence.

Without doubt the Medieval-17th-century bipolarity is a special characteristic of the Tiglieto building; the conservation for future generations of this duality reflects the effort to preserve the building's authenticity (photo 11 and 12).





various professions – art historian, the architect overseeing the restoration, the architect responsible for the protection of the building, the structural engineer and the expert in building materials – lead to a philologically and scientifically based

The collaboration, both during the project and during reconstruction, between the

restoration. Given the results obtained, it is considered vitally important that the restoration of the church continues, extending work to the interior and the cloistered areas which are in very poor conditions.

*The Technical Data Sheet for the products mentioned in this article are contained in Mapei binder No. 3, "Building Speciality Line".*



PHOTO 11

## TECHNICAL DATA

Abbey of Santa Maria di Tiglieto – Tiglieto (Genoa, Italy)

**Year Built:** 12th century

**Restored:** 1998

**Structural Designer:** Giorgio Stella – an engineer with Studio Tecnico Stella Franzese e Associati (Genoa, Italy)

**Project Manager:** Paolo Franzese, Arch.

**Contractor:** Edilge Costruzioni Srl - Genoa

**Project Manager for the Contractor:** Francesco Molinari

**Mapei Products used for the restoration of the vault:**

MAPE-ANTIQUE MC  
EPORIP  
MAPE-ANTIQUE FC  
PLANICRETE  
STABILCEM

**Mapei Product used for the reconstruction of the trusses:**

EPORIP

**Mapei coordinator:** Enrico Grasso

# The consolidation of VINAVIL

by Ernesto Pedolazzi

A series of initiatives have been launched to increase the production capacity of the Villadossola and Ravenna factories in the field of chemical products for the building industry and to ensure greater integration with Mapei activities. By the end of 2001, a 30,000-ton plant will be fully operative in Egypt producing vinyl acetate emulsions for the Middle East and North African markets.

During the Sanremo song festival a couple of years ago, TV presenter Fabio Fazio welcomed the glossy-looking singer Anna Oxa with a witty remark: "What did you do - cover yourself in Vinavil?" Behind that comment was a simple reality -

Vinavil is a household name. Best known as a glue, the red and white 125 g plastic bottles or 1 kg jars used by DIYers are immediately recognisable wherever you go in Italy. Approximately 70 different types of Vinavil are produced, each with a

specific purpose.

Vinavil came under the control of the Mapei Group in July 1994, after having been part of the Montedison and Enichem groups. Thanks to this acquisition Giorgio Squinzi, President of the Italian multinational, recalls "Our Group was able to make an important integration right at the root of its activities as a producer of adhesives for the construction

*Photo 1.*  
Left to right:  
Eng. Giovanni Lilla,  
Villadossola factory  
Director, Ernesto  
Pedolazzi  
(Engineering  
Department) and  
Zaverio Rovca,  
Vinavil's Managing  
Director.

## HEADQUARTERS

-  ITALY - Milan
-  U.S.A. - Garland
-  CANADA - Laval

## PLANTS

-  VILLADOSSOLA - Italy
-  RAVENNA - Italy
-  LAVAL - Canada
-  CHICAGO - U.S.A.



PHOTO 1



## APPLICATIONS

### DISPERSIONS FOR PAINTS

Vinyl acetate homopolymers, vinyl versate copolymers, vinyl acetate - ethylene copolymers for paints.

### DISPERSIONS FOR ADHESIVES

Vinyl acetate homopolymers, vinyl acetate - ethylene copolymers for paper, cardboard and wood.

### DISPERSIONS FOR TEXTILES

Vinyl acetate homo and copolymers self crosslinkable homo and ethylene copolymers.

### FOOD GRADES SOLID POLYMERS

Bulk and flakes vinyl acetate homopolymers.

### SOLID POLYMERS

Leads vinyl acetate homopolymers for solvent based adhesives.

### REDISPERSIBLE POWDERS

Vinyl acetate homo and copolymers for the building industry.

## Villadossola plant and laboratory







industry." At the same time, Mapei became the absolute leader in Italy in the field of vinyl acetate resins.

Today Vinavil employs 285 and can boast an annual turnover of ITL 140 billion and sales of over 90,000 tons (half of which are exported to 30 nations). A large investment programme is underway involving both the Villadossola factory (in the province of Verbania) and the Ravenna factory. The investment is aimed at increasing production capacity and satisfying an increasingly demanding market, both in terms of quality and in terms of diversifying the production range. For example, with its new generation of superplasticiser for mortars Mapei is rapidly gaining market share with the MAPEFLUID X range of products.



PHOTO 2

*Photo 2 A detail of the Villadossola factory : EVA plant*

*Photo 3-4 Vinavil is manufactured in bead form at the Villadossola plant*

*Photo 5 Ready-to-use Vinavil emulsion*



PHOTO 3



PHOTO 4

Zaverio Rovea, Vinavil's Managing Director states that "Our first objective is to improve our profitability so the company can stand on its own feet. Our second objective is

to expand and increase our presence on international markets. At the same time we want to boost the company's image and increase our profile with international clients. Team work, reacting fast to market conditions, sense of urgency in our people and paying more attention to quality and safety aspects are more specific objectives that are just as important to our strategy."

### The meaning of Vinavil

These are feasible objectives since Vinavil is backed by Mapei, already a world leader in the field of flooring adhesives. But first of all, what exactly does Vinavil mean? It literally means Vinyl Acetate Villadossola. Vinyl acetate is the raw material (monomer) used to manufacture Vinavil, the chemical composition of which is polyvinyl acetate (polymer). Villadossola is the location where Vinavil was first made and where it is now produced. Vinavil is a



PHOTO 5

milky liquid with a mild, yet not unpleasant smell. It is known for its adhesive properties, but it is not only a glue. On the contrary, in one specific instance it is best for it not to be adhesive at all. That's right! Because one of the specific (and odd) uses for this polymer is chewing-gum. Chewing gum is made up of 75% "basic gum" - the rest is made up of aromatic substances, food colour, etc. Well, this "basic gum" is pure Vinavil which has been made in Villadossola since the 1970s, and is now produced in Ravenna.

Vinavil is also used in hair sprays - where you see the PVA abbreviation on the label (PVA, polyvinyl acetate) that is Vinavil. It is also marked CF3 (literally



meaning cheese crust) as a protective external layer against bacteria for non-matured cheese, such as Emmental, Rigatello, Fontal or Provolone. Still with foodstuffs, one of the widest uses of Vinavil is for food packaging: eg. pasta, rice and sugar.

#### Adhesive properties

Vinavil's real strength lies in its adhesive properties. In 1976 the Icmesa plant leaked dioxin in Seveso polluting the surrounding lawns with the risk that rain could wash the dioxin out of the grass and into the water table. The risk of pollution was blocked by spraying a diluted solution of Vinavil using anti-parasite spraying machines. The grass was then cut and burned. Around the same time, Vinavil was used for another rather unusual application. Sand blown by the sea breeze caused the decay of maritime pines near the beach of the presidential estate of S. Rossore, Tuscany. The strand was sprayed with diluted Vinavil which fixed the sand, consequently allowing the trees to recover and regain strength.

But above all, Vinavil is found in household furniture. It is used for assembling pieces of furniture, gluing laminated plastic on chipboard or wood laminate kitchen furniture, and applying veneer on lower quality wood. A certain sort of Vinavil is dissolved in a solvent which produces a mixture called wood pulp that when dried can be used as normal wood, which is then employed for

making furniture (eg. frames).

Vinavil is also applied in the paper processing industry for gluing wall paper, carton boxes and for binding books. It is also used in the building industry (it makes up 10-20% of the composition of washable and non-washable paint for interior and exterior application, stucco decorations, floor and wall tile adhesives), in textiles (from synthetic carpeting to velvet curtains and upholstery, and from hygienic diapers to scented paper tissues) and in the paper industry where it is used for glossy paper in newspapers and magazines. In other words, Vinavil is ever present. "The biggest market segment is, however, without a doubt," confirms Rovea, "chemical products for the building industry." So let's take a look at the investments already made and those under way.

The following are the initiatives taken in Villadossola after having expanded the production of solid resins in 1998 with an 80% increase in production of these specialised products up to a total of 1,500 tons:

- the installation of three units to dry copolymer lattice for manufacturing redispersible powders. These products are essential components for formulas in the building industry, for example, tile adhesives, grouting, repair mortars, hydrophobic mortars etc. A yearly capacity of over 6,000 tons is expected with work having been completed by mid 2000;

- reintroduction of the acrylic and styrole-acrylic copolymer emulsion production line. Setting up this production line again is part of a production rationalisation project for Mapei locations and an extension of the Vinavil product line for building coatings. The plant is expected to re-open by the end of 2000, with a yearly production capacity of approximately 10,000 tons. The range of products includes tailor-made compounds used in building formulas as well as lattices used as water paint binders.

A series of projects to optimise both production and machinery are in progress at the Ravenna factory. These projects are:

- the substitution of an obsolete reactor with a new

#### Vinavil in Ravenna's petrochemical complex





Photo 6 Vinavil R&D Laboratory in Milan

Photo 7-8-9-10 Testing and manufacturing phases for vinyl acetate emulsions at the Ravenna plant



PHOTO 9



PHOTO 8

automated unit to manufacture food-grade polyvinyl acetate for chewing-gum. This product is the basic gum used for manufacturing chewing-gum and is much in demand on the European and American markets for its qualities (high degree of purity, stability at different temperatures, virtually zero acid residue over time). The new reactor started working a few months ago;



PHOTO 10

- product diversification with new acrylic based water solution polymers - a new generation of superplasticiser mortars, a field in which Mapei has the technological leadership, with products patented world-wide. The expected annual production of these emulsions is approximately 15,000 tons, allowing Mapei to continue its sales inroads on the market with its MAPEFLUID X line of products.

- an increase in the production of suspending agents used in the manufacture of polyvinyl chloride (PVC). These products are made up of vinyl acetate copolymers and polyvinyl alcohol developed to suit specific customer requirements.

The aim is to increase the company's presence overseas. Vinavil is already present in Canada and the United States where, Rovea explains, "We have production facilities and research centres for vinyl acetate and acrylic emulsions used in chemical products for the building, adhesives and paint

industries." Vinavil Americas is presently carrying forward an expansion programme in Canada and the USA. Output from the Canadian factory in Laval near Montreal and from the Chicago factory in the US is expected to more than double.

In the meantime, on the 24th of April 2000, VINE was set up in Egypt. The new company - Vinavil Egypt for Chemicals SAE - was founded in a joint venture with the Lebanese group, Obegi and its Egyptian subsidiary, Obegi-Fahmi. Construction has started off a plant in the new industrial area on the Gulf of Suez that will manufacture vinyl acetate emulsions and paints for the construction industry. Annual production will amount to 30,000 tons and is destined for the Middle East and North African markets. VINE will employ around 40 people and will be operative from the end of 2001. The factory, in which initial investment totals around ITL 14 billion, is part of what Rovea sees as "a decisive strategy towards strengthening our position in the Middle East, a market in rapid expansion and in which Vinavil has historically been present with its products and well-known brand name."

### PART OF THE MAPEI GROUP SINCE 1994

Vinavil became part of the Mapei Group in the summer of 1994 when the Italian multinational acquired Enichem Synthesis, a company belonging to the Enichem group which produced fine chemicals, specialised products and vinyl acetate resins. In other words, when Mapei, world leader for flooring adhesives, was already one of Vinavil's biggest clients. The history of Vinavil goes hand-in-hand with the history of the Italian chemical industry. Vinavil started off in the beginning of the 1940s as Rhodiatoce (Montecatini), it then acquired the Edivil brand from Sicedison, then it became part of Enimont along with the Ravemul brand owned by Anic, later becoming Enichem Synthesis before finally being acquired by Mapei. Consumers recognise Vinavil for its white bottle with a red cap, but above of all Vinavil is the basic raw material for paints, adhesives and many other industrial products. Some of the products manufactured using Vinavil include chewing-gum and the cheese-rinds of Dutch cheeses.



Headquarters - Milan, Viale Jenner  
Factories - Villadossola (Verbania), Ravenna, Chicago (USA) and Laval (Canada)

Employees - 285

Turnover - approx. ITL 140 billion with more than 90,000 tons of sales, half of which exported to 30 nations.

R&D Laboratories - Villadossola and Milan  
Since 1995 Vinavil has been ISO 9001 certified and since 1997 has been part of Federchimica's Responsible Care project.



INIZIATIVA  
AMBIENTALE  
1999

# Meeting at the trade fair stand

by Manuela Orlando and Reiner Wetzel

In January Mapei was present in Hanover (Germany) at the Domotex trade fair, in Zuidlaren (Holand) at Vakbeurs, in Poznan (Poland) at Budma, in Birmingham (UK) at Expotile, in Basel (Switzerland) at Suissbau, and in Las Vegas (USA) at Surfaces. In February we were present in Austria in Wels and Salzburg at Kachelofenbau and Texbo, in Berlin, Germany at Bauten, in Brussels, Belgium, at the Batibouw and then again in the USA in Orlando at World of Concrete. During The first couple of months of 2000, the Mapei stands with their famous coloured building cubes were also used at trade fairs in Italy: in February in Bologna at Europolis, in March in Milan at the Meeting Ambiente 21, then again in Bologna at the traditional annual Saiedue. Then yet again abroad (Stockholm) at Nordbygg VVs. We could continue our endless list of Mapei engagements in trade fair shows with an international taste, but suffice it say that over 20 more trade fairs were already on the agenda for the first six months of the year alone.

The Mapei Group strategy is clearly apparent from this first list of trade fairs: to participate in all international trade fairs in which space is given to innovative systems and ecological products destined for the building sector. Although this is the era of globalisation, Mapei must also participate in local European shows, since each country has its own product and law certification system for safeguarding consumers and customers. Without that certification, the product cannot be placed on the market. Mapei is heavily involved in certifying its range and producing environmentally friendly products because it believes in offering its customers extra value. That is also why the company actively participates in local trade fairs. Technologically and commercially speaking, Mapei adapts to the requirements of each single country. This is the simplest and most transparent method of offering building products and solutions that satisfy local construction specifications and clients' needs.

Trade fairs are, what Adriana Spazzoli, Mapei Group's Marketing Manager, always defines as "the heart of the commercial activity of a firm." And they continue to be so even though a lot has changed in the way companies now exhibit. Today shows are not seen as being exclusively a place where products are presented, but a meeting place where opinions



Domotex





Pictured here are a few of the stands used during the first two months of 2000. A recurring motif of these stands is the golf course which is not just a way of grabbing people's attention, but a way of showing how a textile flooring can be installed with Mapei's ECO adhesive. Pictured above are Reiner Wetzler (left), Marketing Manager (Mapei GmbH), and Manuela Orlando (right), in charge of the organization of the fairs in the Mapei Group.



## TRADE FAIR CALENDAR 2000



### January

15-18	Domotex	Hanover (D)
18-21	Budma	Poznan (PL)
18-22	Vakbeurs	Zuidlaren (NL)
23-26	Expotile	Birmingham (UK)
25-29	Suissbau	Basel (CH)
26-28	Surfaces	Chicago (USA)

### February

2-4	Kachelofenbau	Wels (A)
2-5	Texbo	Salzburg (A)
3-6	Europolis	Bologna (I)
16-20	Bautec	Berlin (D)
20-24	World of Concrete	Orlando (USA)
24.2-5.3	Batibouw	Brussels (B)

### March

2-5	Meeting Ambiente 21	Milan (I)
15-19	Saledue	Bologna (I)
21-25	Nordbygg VVS	Stockholm (S)
31.3-3.4	National Wood Flooring Association	Las Vegas (USA)

### April

4-7	Mosbuild	Moscow (USA)
11-15	Costruma	Budapest (HU)
11-15	Megra Gornja	Radgona (SLO)
16-20	IBF Intern. Building Fair	Brno (CZ)
25-29	Fecons	La Habana (Cuba)
27-28	Betontag	Vienna (A)

### May

2-5	Coverings	Orlando (USA)
3-6	Sibex	Singapore
21-25	Interbuild	Birmingham (UK)
29.5-3.6	Fematec	Buenos Aires (RA)

### June

1-4	Marmi e Macchine	Carrara (I)
6-24	CSI 2000	Atlanta (USA)

### July

16-19	Tilax	Melbourne (AUS)
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### August

13-18	The National Hardware Show	Mauai (Hawaii)
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### September

20-23	World Adhesives Conf. Feica	Barcelona (E)
8.9-1.10	Mostra Internazionale Marmi	Verona (I)
	National Tile Contractors Asso. Of America	Dallas (USA)

### October

3-8	Cersaie	Bologna (I)
18-22	Saie	Bologna (I)
29.10-1.11	Tile Contractors Asso. Of America	Orlando (USA)

### November

2-5	Infralympics	Athens (GR)
16-19	Phil Construct	Philippines

can be exchanged, discussed and, above all, where business relationships can be developed and enhanced. After all, trade fairs are a great opportunity for getting to know the best names in the building industry. This is why, from now on, Realtà Mapei International will publish the calendar of the most important building trade fairs as an invitation to all to take note of technical and commercial innovations.



# MAPEI TUNNELING LINE

Mapei's products for tunnel construction are the result of exhaustive research and on-site testing and are designed to meet the specifications of individual projects. Mapei offers a complete line of materials formulated for tunneling work (for both new constructions and the rehabilitation of corroded structures) and provides architects with complete technical support through an extensive network of qualified technicians all over the world. Used successfully for a number of highly demanding projects, such as the Italian State Railway's high-speed train line, its products have also been approved by the Swiss State Railways (S.B.B.) for the St. Gotthard Tunnel.

## Products for tunnel construction

One of the company's main lines is in products specifically formulated for wet mix shotcrete, where their high technology properties - combined with the formulation of mix-designs tailored to project requirements - make it possible to

obtain high performance pumpable shotcrete and slurries that reduce rebound loss and are durable even in the presence of aggressive soluble salts.

The Mapei Technical Service offers the following services to specialized

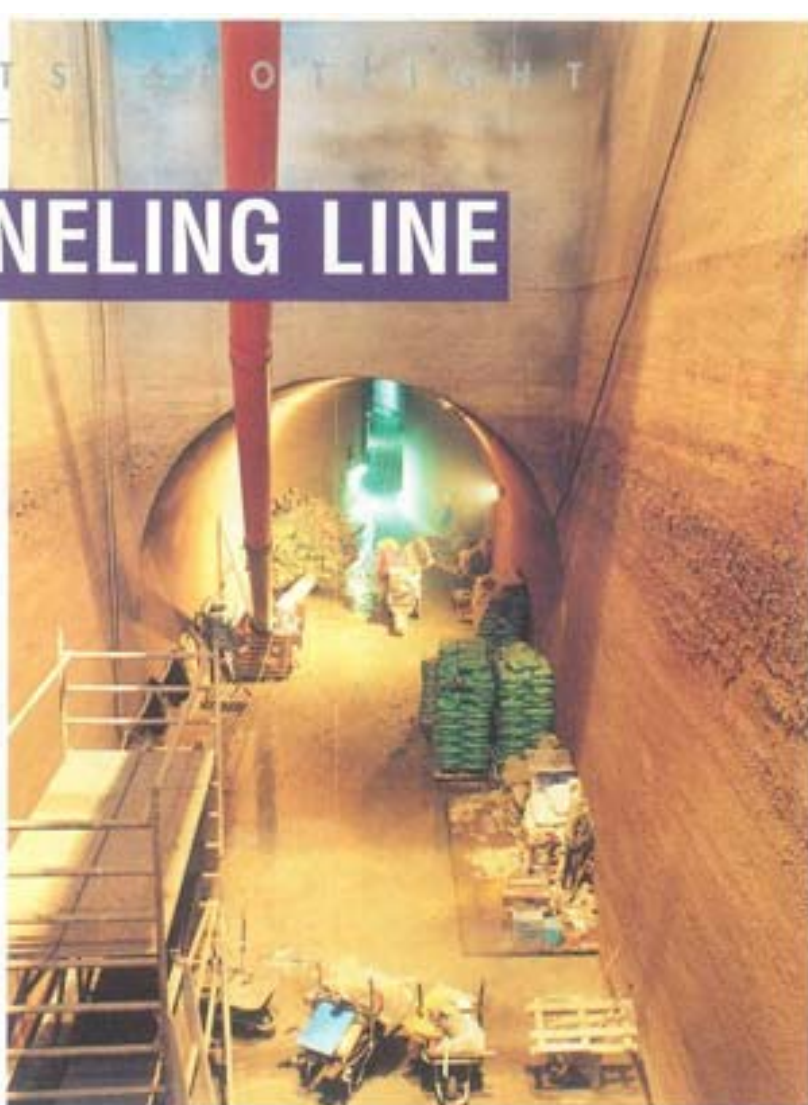
contractors:

- On-site analysis and problem solving.
- Chemical and physical testing of materials.
- Development of the mix-design.
- Supply of products.
- Technical Service support during construction.

Mapei's products for tunnel construction can be used for new constructions or the rehabilitation of corroded structures.

## 1. Wet mix shotcrete

Mapei's range of superplasticizing admixtures for shotcrete includes MAPEFLUID; MAPEFLUID X404, a new generation acrylic-based admixture for preparing highly durable slurries and concrete with very low water/cement ratios that stay workable for long lengths of time; MAPEQUICK, a line of setting accelerators specifically formulated for shotcrete; and MAPEPLAST SF, a pozzolanic silica fume admixture for thixotropic, watertight, chemically resistant slurries.



**MAPEI QUALITY SYSTEM**

MAPEI

BUILDING FOR THE FUTURE





### 3. Grouting - fluid mortars and slurries

Fluid mortars and slurries used for grouting need special additives and cementitious binders to meet performance requisites. Injection slurries, for example, need a low degree of viscosity for them to be easily injected or pumped over long distances with no segregation or bleeding, while mortars need to have high compressive strength and controlled shrinkage. As well as MAPEFLUID superplasticizing admixtures and MAPELAST SF, Mapei produces STABILCEM - an expanding cementitious binder to use on its own, or mixed with appropriately graded aggregate for fluid injection slurries and mortars with controlled shrinkage.

### 4. Anchoring

MAPELAST SF (in combination with EXPANFLUID or MAPEFLUID) and STABILCEM are also used for anchoring purposes, where the product must solidly bond the metal bars to the concrete or rock. For this reason they must be volumetrically stable. Moreover, anchoring systems must have a fluid or thixotropic consistency, depending on the



### 2. Dry mix shotcrete

Repair mortars for wet mix applications need to adhere strongly to the substrate and have controlled shrinkage and thixotropic properties so they can be applied in substantial thicknesses. Mapei has developed MAPEGROUT for this specific purpose - a line of premixed thixotropic cementitious mortars resistant to chemical attack for surface and structural repair of corroded concrete in a complete range of one- or two-component products with various mechanical performance properties and modulus of elasticity that can meet any project's requirements. MAPEGROUT GUNITE LINE offers similar levels of performance with a range of mortars formulated for watertight, sulphate-resistant dry mix gunite.



use, and must be easily pumpable with the most commonly used equipment. EXPANFLUID is an expanding admixture for fluid anchoring slurries and injection slurries for tie rods and post-tensioning cable sheaths. Other products in this line include MAPEFILL, an expanding cementitious mortar with fluid and superfluid consistency for anchoring metal bars and tie rods, and ADESILEX PG1, a thixotropic epoxy mortar which can also be used for bonding metal plates, as well as for structural bonding that enables precast quoins to be adjusted while work is in progress.



### 5. Injection

EXPANFLUID and STABILCEM are also used in the preparation of formulas for the monolithic repair of cracked concrete. The substances to be injected need to be fluid in consistency for easy pumping into narrow cracks, and should adhere to the substrate without appreciable shrinkage. Mapei's EPOJET is a fluid epoxy resin specifically formulated for consolidation slurries and is ideal for this type of repair work.

### 6. Concrete coverings (toe walls, inverted arches, calottes, piers)

Building toe walls, inverted arches, calottes and piers requires pumpable watertight concrete with high mechanical strength and low hygrometric shrinkage that is chemically resistant to aggressive agents present in the atmosphere, soil and rock, and to water seepage. Mapei can formulate specific mix-designs and recommend admixtures for concrete that can meet any performance requirements. Again, MAPEPLAST SF is suitable for this type of construction work, as is MAPEFLUID which offers the advantage of prolonged workability where long-distance transport or long delays in placing are involved. In addition EXPANCRETE, an expanding powdered admixture for concrete with controlled shrinkage, can also be used.

### 7. Products for placing precast quoins

Placing precast quoins often requires adhesives that can ensure monolithic bonding and long adjustability time.

This product line consists of:  
ADESILEX PG1, 2 and 3: thixotropic

The Mapei Tunneling Line features the following products:

MAPEFLUID  
MAPEQUICK  
MAPEPLAST SF  
MAPEGROUT  
STABILCEM  
EXPANFLUID  
MAPEFILL  
ADESILEX PG1  
EPOJET  
EXPANCRETE  
IDROSTOP  
LAMPOSILEX

LAMPOCEM  
IDROSILEX  
IDROSILEX  
PRONTO

MAPELASTIC  
EPORIP  
PLANICRETE  
MONOFINISH

PLANITOP 100  
MAPECOAT I24  
MAPECOAT W



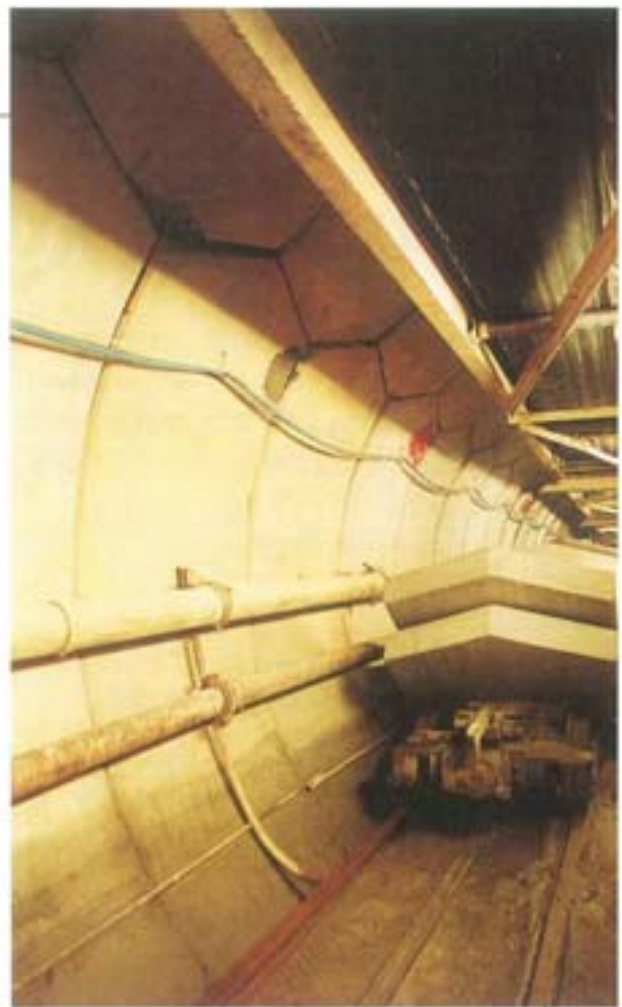




epoxy mortars for structural bonding that enables precast quoins to be adjusted while work is in progress.

### 8. Waterproofers

When it comes to the durability of constructions, Mapei has a complete line of waterproofers for the widest range of conditions. This includes IDROSTOP (for watertight working joints between toe walls and inverted arches, calottes and piers); LAMPOSILEX and LAMPOCEM (fast-setting and ultrafast-setting and hardening hydraulic binders for sealing water leaks); IDROSILEX and IDROSILEX PRONTO (a watertight brush-on mortar); MAPELASTIC (a flexible mortar for bridging cracks up to approx. 1 mm across), and BIBLOCK and TRIBLOCK epoxy cements for treating damp surfaces.



### 9. Finishing and protective products

Lastly, Mapei also offers a complete line of products for protecting and finishing concrete with surface imperfections that can solve the widest variety of problems, from bonding new to old concrete, to protecting concrete surfaces with epoxy resin paint. This product line consists of EPORIP, PLANICRETE, MONOFINISH, PLANITOP 100, MAPECOAT 124 and MAPECOAT W.



# Tunneling technology at IUT

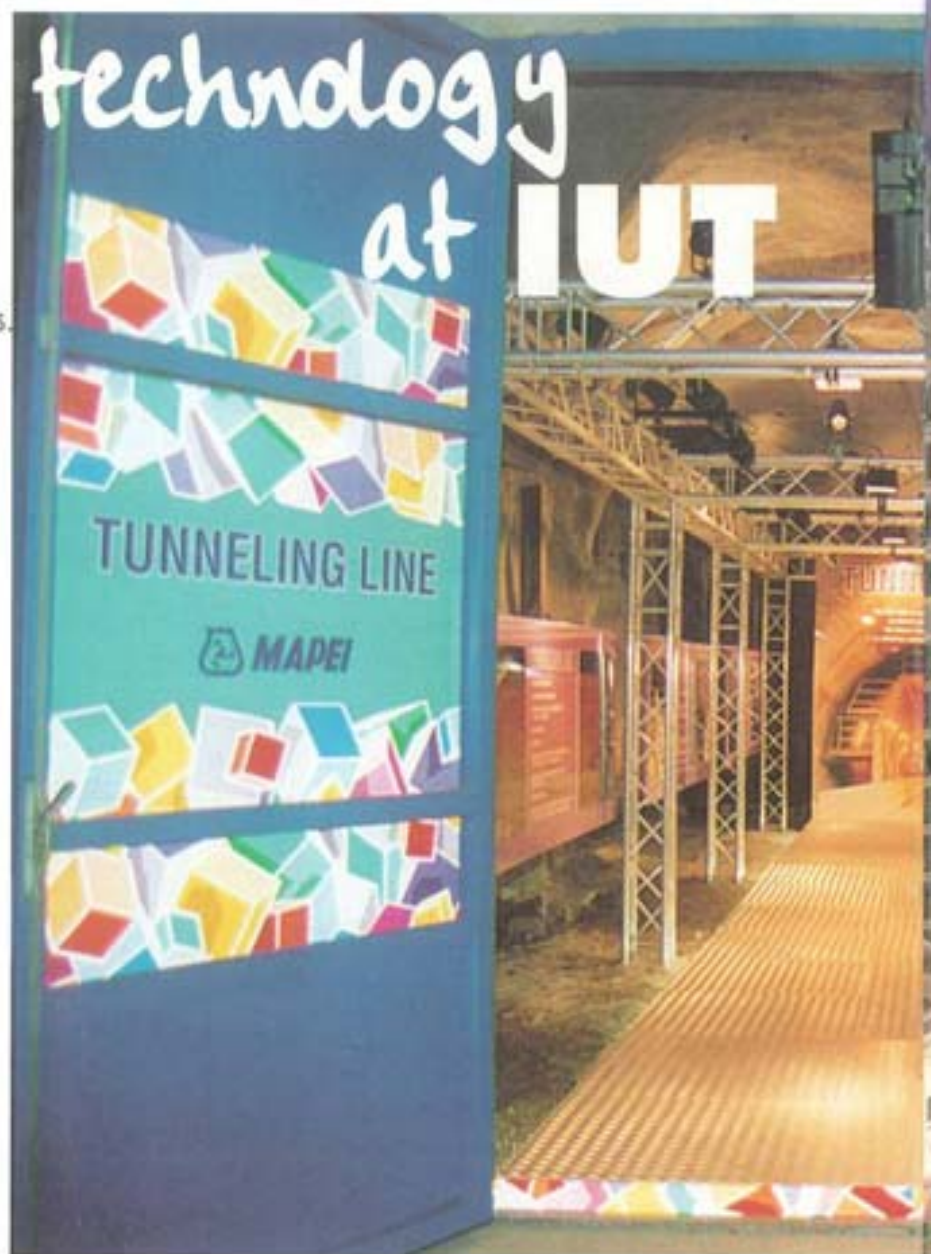
For the first time Mapei participated at the IUT Swiss trade fair and presented its "Tunneling Line" range of products which has met the relevant test standards.

by Enrico Dal Negro

Mapei was present for the first time at the October IUT '99 trade fair, the International Fachmesse der Untertag und Tunnelbauer. The fair takes place every four years in the Swiss town of Heidi. Manufacturers are given the possibility of presenting the latest in their line of technologically advanced products for tunneling to the specialists in this field. The trade fair provides a global look at all underground activities, from drilling and digging to final lining and security measures for operating tunnels. After the first preview of its "Tunneling Line" products at the 1999 Saie trade fare, Mapei officially unveiled its range at the IUT. This line of products was developed in Mapei's research laboratories and satisfies market needs, which means easy and fast application, use of economically advantageous materials and conformity with all safety requirements. A real tunnel is the final testing ground. Mapei is the only Italian company associated with the V-S-H

(VersuchsStollen Hagerbach) facilities in Flums, a town in the San Gall canton in the German part of Switzerland. The V-S-H is an abandoned mineral tunnel where associated companies can carry out on-site testing and get immediate results thanks to the Swiss federal authority laboratory.

In association with Italcem, Mapei has been authorised to act as supplier of products



(water reducing admixtures, active pozzolanic mineral admixtures and setting accelerators) to the Altransit association that will be constructing the 57 km St. Gottard pass railway tunnel.

The tunnel-like setting of the Mapei stand at the IUT trade fair was visited by the most important Italian purchasing, engineering and construction representatives in the tunneling field. These same representatives were present at a conference (near the castle of Maienfield) in which the most advanced technologies for the manufacturing of wet shotcrete were illustrated by Mapei. In the presence of Giorgio Squinzi, President of the Italian multinational, Prof. Mario Collepardi explained the techniques used to mix and use shotcrete and presented details of the results of tests carried out. Collepardi also coined the term HPS (High Performance Shotcrete) deriving from the capacity of obtaining high performance shotcrete - both mechanically speaking and in terms of durability through the use of new generation alkali-free setting accelerators (MAPEQUICK AF 100, MAPEI RESCON AF 2000 and MAPEI RESCON AF 55). Enrico Dal Negro,



manager of the new "Tunneling Line", illustrated the technical and economical advantages of the use of high technology materials. Particular attention was paid to the MAPEFLUID range water reducing admixtures and to the MAPEPLAST SF pozzolanic silica fume admixture. Dal Negro also underlined the special feature of Mapei setting accelerators which, even when used in portions lower than 7%, allows shotcrete to be immediately self-supporting, even where thick layers are applied and in the presence of water, with jet volumes greater than 20 m<sup>3</sup>/h. In a field with high risk factors, it is of fundamental importance to have reliable and safe setting accelerators for rapid economical results. Finally the use of high performance shotcrete as a final coating was discussed.


Pasquale Zaffaroni, Mapei's building Product Manager, illustrated the Italian multinational's activities which led to the Altransit certification. The whole period of certification was described, including the difficulties faced and the technical solutions adopted, and the strict standards which the Mapei-Italcementi team had to adhere to throughout the qualifying period. And from words they immediately passed to the actual facts, creating and making shotcrete mix. The design of mix used for the Altransit certification was adopted: a cement mix

capable of maintaining workability (> than 40 cm spreading over the DIN chart after 15 hits) for less than 8 hours. Once the right mix ratio of components was found, including hyperplasticising water reducing admixtures and plasticisers (MAPEFLUID X404 and MAPEFLUID N10), the mixtures were prepared.

The choice of binder was a strict parameter and was adopted to demonstrate the reactivity of Mapei setting accelerators even with "slow" setting cement. The cement was



CEM IV/A A.A.R.S. (highly resistant to sulphates and therefore free of tricalcium aluminate) by Italcementi of Vittorio Veneto in proportions of 450 kg/m<sup>3</sup>. The demonstration was given seven and a half hours after the preparation of the mixture. The concrete had S5 workability thanks to the use of zero slump loss admixtures.

Spraying was carried out with an electronically controlled dosage machine, which controlled the amount of accelerator admixture in relation to the quantity of cement used, thus removing any arbitrary decisions made by the operator during the spraying phase. 

# RESISTING SULPHATES

The Piedicastello tunnel on the Autobrennero motorway was repaired with the use of special mortars and modified spraying machines.

*by Pasquale Zaffaroni*



Thanks to the adoption of special procedures, normal maintenance of the northern gallery of the Piedicastello tunnel is now possible. The intervention was commissioned and directed by the Brennero A22 Motorway Authority. The tender to repair the tunnel was won by ATI, a subsidiary of S.C.A S.p.A of Rome (Società Costruzioni Appalti). The Piedicastello tunnel is made up of two supporting arches just 2.8 metres apart and with a maximum of 100 metres of rock above them.

The southern gallery was used to test and perfect a special spraying machine (a Putzmeister MP 25 S, distributed in Italy by Agres S.r.l) that continually mixes mortar and is normally used for applying civil plaster. As this equipment - chosen for its versatility and ease of use - lived up to expectations, it was also used for the 900-metre northern tunnel.

## The work in detail

The Piedicastello tunnel was dug in the 1970s. It cuts through porous and

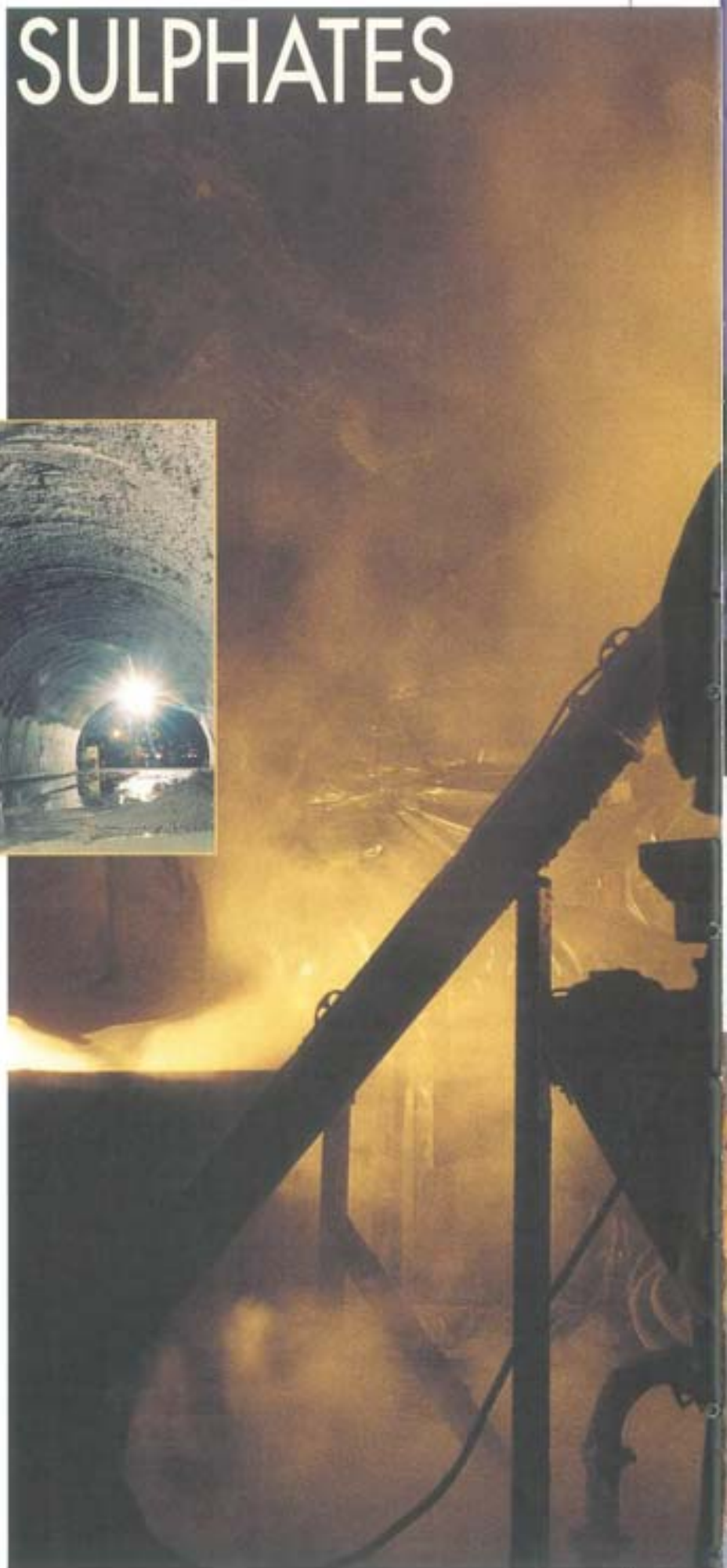




PHOTO 1

weak Cretaceous and Palaeocene sediments. The lining of the tunnel is not waterproof and the crown is almost completely reinforced while the pier and invert are partially reinforced. The high permeability of the crumbling rock formation and the absence of waterproofing have contributed to infiltrations of water and the constant trickle of water through the lining,



particularly on the crossing castings and those running lengthways.

The main causes for the deterioration in the concrete were the combination of infiltrations of water rich in soluble salts, especially sulphates, along with freeze-thaw cycles around the tunnel entrances and carbon dioxide and sulphuric anhydrite emissions. Detailed investigations on the state of conservation of the



tunnel commissioned by the Brennero Motorway Authority led to the following conclusions:

- the Piedicastello tunnel did not have any severe construction defects;
- although cracks were present, the concrete in the internal section of the tunnel was good quality. The surface concrete had deteriorated with the damage affecting a layer of between 5-25 cm deep over the surface;

- the lining was subject to stress due to the type of overlying rock;
- the rock mass in the immediate vicinity of the lining was severely cracked with gaps.

The basic criterion adopted to restore the tunnel involved repairing and waterproofing the outer surface and improving the interaction between the lining and the rock mass. The Brennero Motorway Authority opted for a "shell" type intervention by cortical hydro-demolition of the lining, and restoring



PHOTO 2



PHOTO 3

and reconstructing the waterproof and insulated draining shell.

### Hydro-demolished and remodelled

After having dismantled the existing supports and having secured the whole length of the tunnel with iron rods, the process of high pressure hydro-demolition to remove the damaged concrete began (photo 1). Luca Manuelli, surveyor of Mosconi S.r.l. of Edolo (TN), the company that carried out the concrete hydro-demolition, explains how "the hydro-demolishing was carried out using a pressure of 1,250 atmospheres on one pump, and 1,350 atmospheres on a second pump, removing on average approximately 8 cm of concrete (a total of 1,400 m<sup>3</sup> of concrete). The water used was then recycled and purified with a special

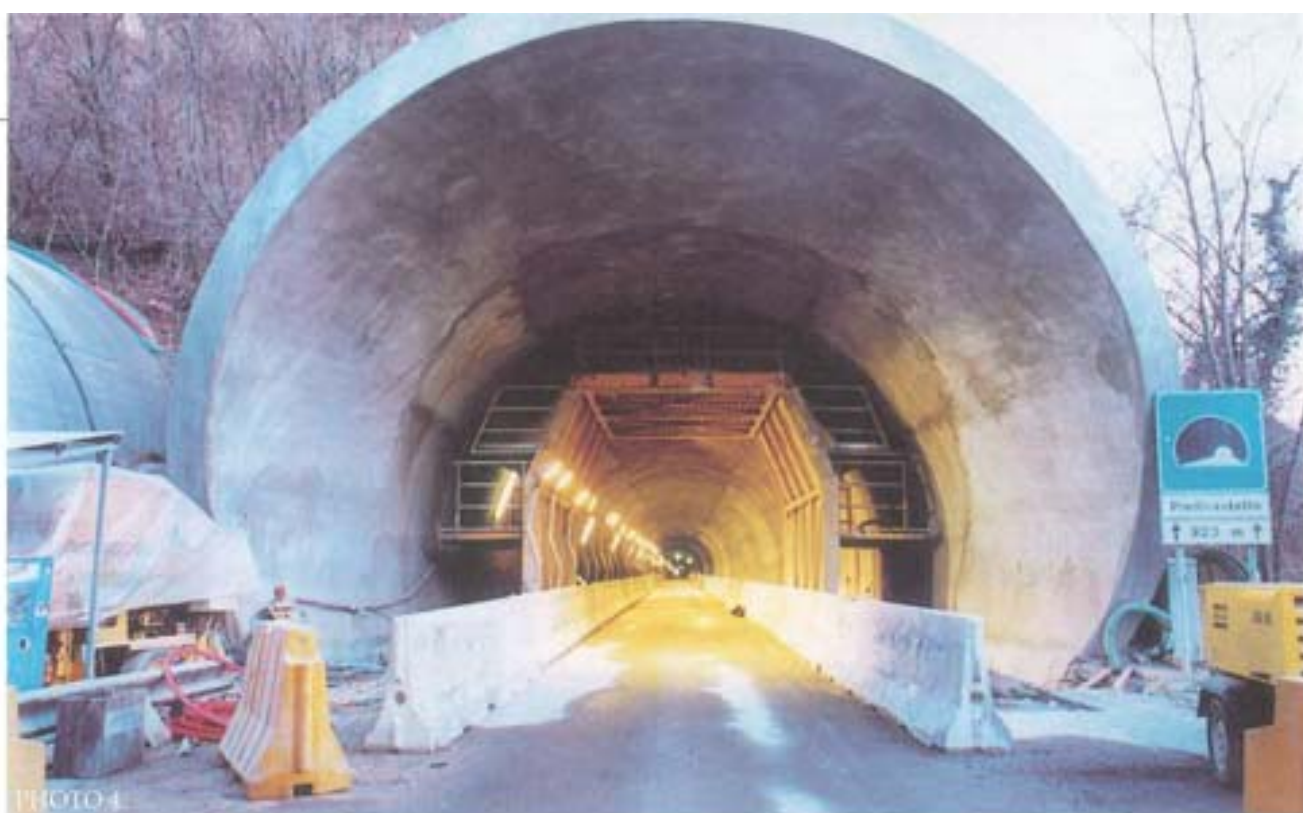


PHOTO 4

machine and, once cleaned, it was drained back into the river."

Hydro-demolition was particularly advantageous in this application as it speeded up the operation, was completely free of vibration (and thus did not affect the other tunnel or the overlying rock mass), and enabled the technicians to remove only the damaged concrete while maintaining the existing reinforcement intact.

Due to structural reasons, work was carried out in accordance with the following procedure:

1. hydro-demolition of the crown;
2. anchoring of exposed reinforcements and filling cavities with pre-mixed cements;
3. hydro-demolition of the walls.

After this phase, the crown was repaired after having first installed a reinforced welded net held up with over 3,000 4.50-m long anchor bolts. The tunnel was then remodelled by reconstructing the thickness with layers of MAPEGROUT T60, a single-component sulphate-resistant fibre-reinforced thixotropic grout (photos 2, 3 and 4).

Finishing consisted in lining the tunnel walls with fretted stainless steel plates, sound-proof padding and non-reflective aluminium panels (photos 5 and 6).

#### Working non stop

The conditions the tunneling workers had to work under were particularly difficult, explained Natale Corina, head of a team of 20 workers on the site: "the 24 working hours were divided into 8-hour

shifts, including Saturdays. There was a change over in shifts every week and basically there was no stopping." Another complication arose due to the conditions laid down when the bid was made: at weekends at least one carriageway had to be open to traffic all the time without interrupting progress.

"The MAPEGROUT T60 used has special characteristics that gives excellent results and good coverage," continues Corina, "so we were able to spray up to 10 pallets with one machine during each shift (12.5 tons per machine)." Work progressed at a rate of up to on average 20 m a day and about 70 men were employed full-time.

#### Resisting aggressions

MAPEGROUT T60, the single-component cement based fibre-reinforced thixotropic grout used on this site meets the strict specifications laid down by the Brennero Motorway Authority. The product was formulated mainly for structural repair work on damaged concrete lining tunnels, canals and hydraulic plant. The low  $C_3A$  content of the cement makes it perfectly resistant to sulphates, a very important factor when in presence of aggressive water, as was the case here. Furthermore, the thixotropic nature





PHOTO 6

of MAPEGROUT T60 makes it easy to wet spray even where there are considerable thicknesses to be applied.

MAPEGROUT T60 also boasts high mechanical strength: in this specific application particularly strong adhesion - over 2 MPa - to the substrate was required, along with adhesion on the "wedge" (according to the motorway method) of over 6 MPa.

#### A tried and tested product

Providing regular supplies of MAPEGROUT T60 was without doubt a difficult task: in fact four truckloads of the product were delivered daily over several months. Research played a crucial role in formulating the product: in fact a series of fatigue resistance tests were carried out in combination with tests on the material's resistance to aggressive agents to monitor the behaviour of MAPEGROUT T60 over time. Freeze-thaw cycle tests undertaken in special test facilities proved the product is particularly resilient.

The Brennero Motorway Authority carried out stringent quality control checks on the material when work was in progress. Some tests were effected on site taking samples of MAPEGROUT T60 during the casting phase, and pull-out tests were performed on the finished lining.

#### Site organisation

The organisation of the site during the months preceding the assignment was in this case essential. For the work to be successfully completed within the tight delivery time schedule set, all the engineers had to work closely together to adapt the machinery and test the materials prior to starting the intervention. This approach meant that everyone had a clear idea of timing, establishing how to optimise production capacity, modify the spraying machines and experiment with applying the product.

*We would like to thank the magazine "Costruzioni" for permission to extract passages from their article in issue no. 5/99. Photos no. 2 and 3 courtesy of Agres Srl.*

#### TECHNICAL PERFORMANCE DATA OF MAPEGROUT T60

Flow:	40-80% (UNI 7044/72)
Compressive strength:	> 60 Mpa (after 28 days)
Flexural strength:	> 9 Mpa (after 28 days)
Static modulus of elasticity under compression:	27,000-31,000 Mpa
Adhesion to substrate:	> 2 Mpa
Adhesion to Motorway Authority "wedges"	> 5.5

The Technical Data Sheet for the product in this article is contained in Mapei Binder No. 3, "Building Specialty Line".



#### TECHNICAL DATA

**Piedicastello Tunnel (North Tube) - Trento (Italy)**

**Intervention:** 1998-1999

**Commissioned by:** Brennero Motorway Authority - A22 Motorway Technical Department

**Project Manager:** Brennero Highway Authority Ing. Vivaldelli

**Contractor:** ATI (S.C.A. S.p.A), Rome Ing. Giuliano Cecchini

**Hydro-demolition company:** Mosconi, Edolo (TN)

**Product used to reconstruct concrete:** MAPEGROUT T60

**Mapei coordinator:** Pasquale Zaffaroni and Fulvio Bianchi

FILIPPO POZZATO  
 PAOLO FORACCIAN  
 ERIC BATTI  
 CRESCENZO D'AMORE  
 GABRIEL CONI  
 AVEL MERCKX  
 CHARLY WOELAERS  
 KEVIN MULHANS

LEIF HOGE  
 DAVID TAN  
 LAZLO BODROGI  
 PHILIPPE KOSSELER  
 CHANG MURAI  
 LUCA PARENI  
 PAOLO BETTINI  
 ANTONIO RIZZI




**MAPEI**

LATEXCO


**QUICK-STEP**



SHIMANO



# STAND BY FOR I

by Alessandro Brambilla

The Mapei-Quick Step team is the undisputed world leader in professional cycling. The team has won the UCI (International Cycling Union) championship every year since 1995. And the start of the 2000 season saw the team set yet another record - there are now no fewer than 39 cyclists from nine different countries wearing Mapei's colours. Add to that figure technicians and other staff and the complete squadron totals 78. With numbers like this, the total of 435 victories gained so far looks like being just the beginning!

The team's new line-up for the 2000 season was announced at Mapei's headquarters in Milan with existing team manager Patrick Lefevere (Belgium) and sports directors Marc Sergeant (Belgium), Fabrizio Fabbri and Serge Parsani being joined by two new sports directors, Spaniard Jesus Suarez Cueva and Roberto Damiani.

As far as the racing team itself is concerned, the major news this season is the arrival of Spanish rider, 24-year-old Oscar Freire Gomez from Torrelavega, who won the World Elite Road Race Championship in Verona on the 10th of October 1999. Freire won the title after only his second year in this leading championship, a feat achieved by few others in their careers. Podiums seem to come naturally to Freire. In 1997 he came second in the Under-23 Road Cycling World Championship in San Sebastian. In the history of Mapei's professional team, Freire is the fourth athlete - along with Camenzind, Abraham Olano (first in Duitama in 1995) and Museeuw (Lugano 1996) - to have worn the champion's jersey.

Freire is joined by no fewer than 11 other new arrivals who will be racing as professionals for the first time this season. Does that mean that the old guard is pulling out? "No way!" exclaims long-term team member Andrea Tafi who won three of his races in 1999, including the Paris-Roubaix. "My goal for 2000 is the Tour of Flanders." Another expected front runner for the 2000 season is 30-year-old Michele Bartoli who had to pull out on the 2nd of June last year after he broke his right knee-cap. Not before he had already won five races, including a magnificent showing at the Flèche Wallonne. In his career Bartoli has won two consecutive World Cups, as has 35-year-old Johan Museeuw, another top name who has been signed up again by Mapei-Quick Step. Museeuw broke his knee in



LING TEAM  
2000



NICOLA CHESSI  
RINALDO NOCENTINI  
DAVIDE BRANATI  
WILFRIED PEETERS  
ADRIANO DANZI  
GIANNI FRESIN  
FRED ROOSEBOEK  
MAX VAN HEESWIJK  
GIULIANO FIGUERAS  
DANIELE NARDELLO  
STEFANO ZANINI  
PAOLO LAMPFRANCHI  
BART LEYSER  
ANDREA NÖE  
MAMUEL FERNANDEZ GOMEZ  
LUCA SCINTO  
MAMUEL BELTRAN MARTINEZ

ANDREA TAFI  
OSCAR FREIRE GOMEZ  
PAVEL TONKOV  
JOHAN MUSEEUW  
TOM STEELS  
MICHELE BARTOLI

# INVASION!



Above: Pavel Tonkov, Oscar Freire and Michele Bartoli. Top right: Freire with Mapei's President, Giorgio Squinzi, and Andrea Tafi. Right: John Museeuw with Rino Ciavardi (Mapei's Export Manager).

1998, but was already back on the saddle in 1999 to win three races. Johan is the only rider still in activity to have won eight World Cup Grands Prix.

Among the most regular winners in the Mapei-Quick Step team is the 29-year-old Belgian Tom Steels. Since he joined the team in 1996 he has won 43 races. Also ready to take up the gauntlet along with Museeuw and the other top riders in the more prestigious of the classic races in the calendar are Stefano Zanini (up until now the only Italian rider to win the Amstel Gold Race) and Belgian Wilfried Peeters.

Other front runners in the Mapei-Quick Step line-up include Paolo Bettini who can always be relied upon to ride



aggressively whatever the type of race and who won five races last year, and Dutchman Max Van Heeswijk who also took five victories in 1999. Equally valid competitors are Giuliano Figueras (six wins), Daniele Nardello (two wins) and Rinaldo Nocentini (two wins). Nardello and Tafi have been racing with Mapei colours since 1994 and are the team members who have given longest service. Figueras was the Under-23 World Road Race Champion in 1996 after having taken the world title for those doing military service the year before.

The money is on the Russian rider Pavel Tonkov for the longer tours. In fact he can already boast a victory in the Giro d'Italia in 1996 in his long list of wins, which includes the title of Junior World Road Race Champion he took in Bergamo in 1987. Tonkov will build up for the 2000 edition by covering a number of shorter tours in legs as practise.

The Mapei team can also count on



some powerful athletes. At 6'3" Paolo Fornaciari and Belgian Axel Merckx are the tallest in the team. Axel is the son of the champion Eddy Merckx who, thanks to his 426 wins and the record he established over an hour, was given the nickname 'Cannibal'. Fornaciari is also the heaviest athlete on Mapei's books at 176 lbs. The shortest rider - Gianni Fresin -



Top left: the Armada of riders in Mapei's auditorium.

measures 57", while the lightweights - a useful factor when tackling up-hill sections - are Paolino Lanfranchi and Bettini at just 128 lbs.

### The debs' ball

The staff on the Mapei-Quick Step team are convinced that the youngsters are the future. And to prove the point, the team is the only one in the top 10 of the International Cycling Union classification to have taken on 11 non-professional riders - the equivalent of 31.4% of the team.

Sports director Roberto Damiani will

be most closely involved in the debs' ball, even if, as he points out, "I won't be the only one to co-ordinate the newcomers tactically. The younger members will often be involved in important races, such as World Cup rounds. But we're not going to push them. Having 39 riders means we won't have to force them into races that suit more expert and better trained athletes. That doesn't mean that the youngsters will be taking it easy, either! Quite the contrary - they'll have to put their backs into improving their competitiveness."

The youngest of all the new arrivals is 18-year-old Filippo Pozzato who came from the junior category. So far, the young rider from Vicenza has already clocked up 74 road race wins, and 50 more on the track. When training in 1997 he won the Italian Road Race title. In 1998 he came 2nd in the World Junior Road Race Championship and 3rd in the timed and chase titles. Last year he was Italian Champion in the individual pursuit, team and individual time trial championships. He had to make do with 4th place in the World Road Race Championship. According to



Damiani, "Many people worry when they hear that Pozzato didn't take part in the under-23 series. We chose to take him on directly to save him unnecessary stress. If he had taken part in the under-23 championship he would have been under pressure to bring home results. With our team he can improve without fear of being squeezed like a lemon."

Another of Mapei-Quick Step's younger signings is Luca Paolini who won 12 races during the 1999 under 23 season and came 2nd in both the European and World Championships. Famous bike builder Ernesto Colnago says Paolini "reminds me of the young Saronni."

Paolini is a classical sprint finisher, or one that establishes a good





lead in long-distance races. Nicola Chesini is instead an expert in coming out of the group to win with a final sprint. He's a fast rider and rode for Pagnoncelli,



Right: The new Mapei-Quick Step team look. Bottom: Alessandra Brambilla and Gloria Bellicchi host the spectacle in Mapei's Milan show room. Inset are photos of a few of the prize-givings. (1) Bartoli receives the international Torretta Prize from Quinto Vecchioni; (2), (3), (4) and (5) show Freire, Steels (the team's 'gunner'), the team's Sports Manager Fabrizio Fabbri and Andrea Tafi receiving Mapei Prizes.

Below, left to right, the Mapei-Quick Step 2000 neo pros: Cioni, D'Amore, Paolini, Hulsmans, Ratti, Koehler, Wegelius, Bodrogi and Sports director Damiani.

a subsidiary Mapei-Quick Step team, for which he racked up 10 wins last year. 21-year-old Crescenzo D'Amore is another rider who has moved across from a subsidiary team, the Grassi-Mapei. Last year he managed to notch up five wins. In 1997 he sprinted to an excellent victory in the World Junior Road Race Championship after taking the Italian title for the kilometre standing start on the track the year before.

Dario Cioni will alternate between racing for Mapei-Quick Step on the road with cross-country mountain biking for Mapei-Diamond Back, the company that has regularly backed him in the past few years. In 1999 he won 11 races, including the Italian Winter Championship. Then there are two 23-year-olds from the same town - Antoni Rizzi and Eddy Ratti from Retegno di Fombio. Rizzi is one of the leading racers in the World Road Race Championship and took five victories in 1999. Early in his career, Antonio won the Italian Individual Pursuit title. He's known for being a strong rider even in hot weather and came 4th in last year's Under-23 Giro d'Italia.

Ratti is another strong performer in the

heat and took three races in 1999, including the difficult Freccia dei Vini.

Talking of classic events on the calendar, the Belgian Kevin Hulsmans won the Under 23 Tour of Flanders as well as eight other races. It seemed quite natural for him to come and race for Mapei-Quick Step, given the team's reputation for winning such classics. Another foreign addition to the team is Laszlo Bodrogi, one of the first Hungarians to go professional. Bodrogi has already proved to be an excellent all-round athlete, taking 11 race wins last year, several of which in France.

The other new international players in the team are 22-year-old Briton Charles Wegelius who took five wins in 1999 and 22-year-old Frenchman Philippe Koehler. Originally from Strasbourg, Koehler took five victories last season. Maybe he'll be Mapei-Quick Step's springboard to the European Parliament!

### Mapei Trophy - the challenge continues

This year journalists, TV crews and photographers from all over the world will be able to take part in the Mapei Trophy. It's not a bicycle race, but a competition to forecast results. Open to the international media, the competition is now in its fifth year. Last year's edition saw 111 people take part with the victor, the photographer Roberto Bettini, winning a holiday of his choice during the prize-giving with Miss Italia, Gloria Bellicchi.



Roberto Bettini, seen right with Miss Italia, Gloria Bellicchi.

The participants have to guess the results of all the races that once made up the Super Prestige, including the major World Cup races, the classic Tours, min stage races and, for this year, the Olympic races.

The Mapei Trophy started on the 18th of March 2000 with the Milan-San Remo, the opening race of the World Cup championship, and will conclude with the Tour of Lombardy on the 21st of October. The current standings and the final results can be seen on the Internet at [www.mapei.it](http://www.mapei.it). For further information, contact Mapei's Marketing Department: tel. +39 02 37673223; fax +39 02 37673214.



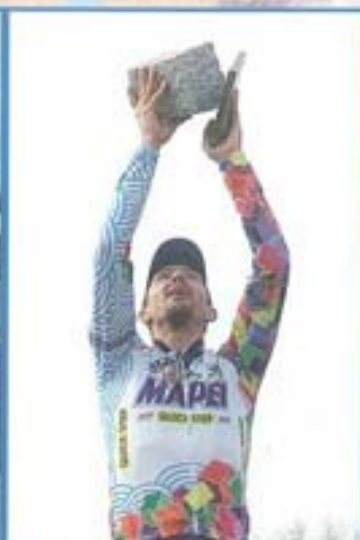
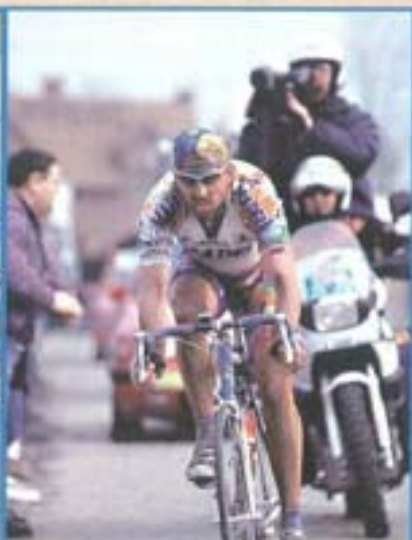
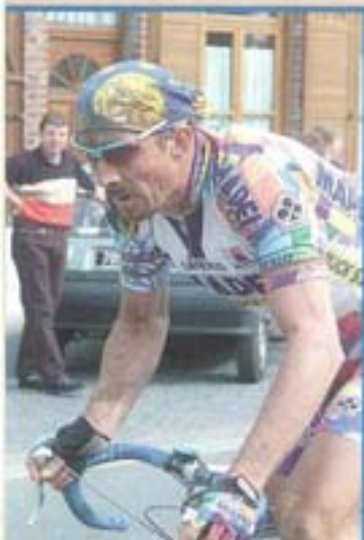
# JOHAN, A LEG UP TO MAPEI-QUICK STEP HEAVEN COURAGE

## WINS THE DAY AT ROUBAIX

Johan 2, the comeback. Johan Museeuw has won the Paris-Roubaix for the second time in its glorious history. Once again the grinding French classic and third most important trial in the World Cup, has welcomed the Mapei-Quick Step team back to its podium. The Roubaix is the queen of the classics and was one of the high points of start of the 2000 season, together with Paolo Bettini's Liege-Bastogne-Liege.

Traditionally, the winner raises his hands in triumph as he crosses the finishing line. Museeuw, on the other hand, sped past it wearing a lion of Flanders bandana and with his left leg raised. A gesture of liberation if there ever was one.

In the 1998 Roubaix, just seven days after his great victory in the Tour



of Flanders, he fell while crossing the notorious Aremberg forest, fracturing his left kneecap. Museeuw was moved to hospital in Ostend where he underwent an operation. He also got an infection, from which he recovered, despite the fact that at one stage he was running a risk of kidney failure. Museeuw was then sent to the intensive therapy department of a hospital in Ghent. In addition to the fracture of his left knee, he was



suffering from a lesion of the quadriceps. These injuries were a serious setback for Johan who was 33 years old in April of that year. Many lesser men would have taken the accident as an excuse to hang up their bike once and for all, but not he. It may even have been the thought of the Roubaix that made him fight on.

The Paris-Roubaix is a little like a goddess who bestows her gifts only upon those children who appreciate her most. Johan and the Mapei-Quick Step team love the Roubaix and its rocky route. It's heaven to them, not hell. The Mapei-Roubaix round of victories began in 1995 with Franco Ballerini's win and Museeuw's third place. A year later the Mapei team took their first 1-2-3 with Museeuw taking first, Gianluca Bortolami in second, and Andrea Tafi third. In 1997, Johan came home third. In 1998, the Roubaix podium was once again dominated by the Mapei colours with Ballerini taking first, Tafi second, and Wilfried Peeter third. Tafi's dreams of a Roubaix victory came true in 1999, whilst wearing the Italian Champion's jersey, ahead of team-mates Peeters and Tom Steels.

This year the Mapei-Quick Step team «made do» with Johan's win and Stefano Zanini's fifth. «The Roubaix belongs to us» has become more than just a slogan to the team. World class cycling's leading team's worst result in six years was a third place in 1997. It managed three hat-tricks in five wins. Over six years, Mapei-Quick Step took 13 of the 18 places on the podium -

that's a staggering 72%!

Not even the big teams of the past such as Coppi's Bianchi and Merck's Molteni achieved results that good.

In the Roubaix 2000, the Mapei-Quick Step team got involved in the first sprint of the day, with Steels, at the 35 kilometre mark. Tafi's fury, on the other hand, made itself felt in the Aremberg forest. His closest rivals, German Zabel and Belgian Van Petegem's team-mates led the chase, however.

The defining moment came after Mons en Pevele, 55 kilometres from the finish. The American Andreu took off and Museeuw fell into line behind him very promptly. «Andreu seemed like a good travelling companion» Johan explained later. «But I knew he was getting tired and so I took off on a stretch of cobblestones. At that point, there was no other option open to me. I had to win, even with the wind in my face.»

Well protected by other riders in the Mapei-Quick step guard including Tafi, Peeters, and Zanini (plus Van Heeswijk and Nardello, who were excellent in earlier stages), he increased his lead to over two minutes. Then, the margin decreased. «I was never afraid that they would catch me» said the victor. «Not even 15 kilometres from the finish when the wind was blowing hard against me. In the end, I managed my lead well.»

While checking on Zabel and the others, Tafi got a puncture five kilometres from home, and had to give up all hope of a second position. Johan's closest rivals crossed the line 17 seconds behind him.

Van Petegem got there before Zabel, Hoffman, Zanini, and others. It was a pitiless Roubaix. But class and heart helped Museeuw through what was probably the biggest challenge of his career.

## KING OF THE CLASSICS

Johan Museeuw was born on October 13th 1965 at Varsenare in Belgium. He now lives in Gistel with his wife, Veronique. Johan and Veronique have two children, Gianni and Stefano. Museeuw turned professional in 1988 and has since won 92 races. He joined the Mapei team in 1995. He ranks the Lugano World Championship of 1996 and the '95 and '96 World Cups as his most important victories.

Museeuw has won the World Cup Grand Prix more times than any other cyclist currently competing. He has won nine trials in all: three Tour de Flandres ('93, '95, '98), two Roubaix ('96 and 2000), two Zurich Grands Prix ('91 and '95), one Paris - Tours ('93), and one Amstel Gold Race ('94). The Belgian also won two stages of the 1990 Tour de France and wore the yellow jersey for two days in both the '93 and '94 outings. In addition to the Roubaix, he has also won the Het Volk, the classic opening race on the Belgian calendar, and the Freccia del Brabante, in 2000. And all cycling fans will be expecting even more of Johan in the future.



# BETTINI, KING OF LIEGE

The Liege-Bastogne-Liege was one of the few classic races that the Mapei-Quick Step team had never won in its long and glorious history, but Paolino Bettini finally gave patron Squinzi's team its first "Liege". It was a very well-deserved victory which he fought for very determinedly. It was also Bettini's first success in a World Cup competition. The Mapei-Quick Step team, king of the classics, got its 14th triumph in a World Cup round. Alex Merckx's hugely important fifth place completed the team's triumph. Together with the Tour of Lombardy, the Liege is the most trying of the classics in terms of altimetry.

186 riders took part in the Liege 2000. Tafi the Gladiator went on the attack at the 80-kilometre mark at the start of the first of the ten cotes, but was soon caught up with by the others. A good gladiator never gives up, however, and so Andrea broke away again in sight of the Redoute climb, the most feared of the whole Liege route.

Along the Redoute, which, by the way, is 2.4 kilometres long with gradients of up to 19%, Bettini, Jalabert, Casagrande and Frigo all took off after Tafi was caught. Axel Merckx covered Bettini's back, but the five's attempt was

neutralised in the end.

The classic was clinched 238 kilometres into its 264 kilometre route, on Sprimont, the eighth of the ten cotes. Rebellin, the Spaniard Extebarria, and the indomitable Bettini all responded to an attack by Belli.

The pacesetters shook off Belli on the Saint Nicholas climb. On the Ans climb, Paolino beat Extebarria and Rebellin in a sprint to the line. Belli managed to snatch fourth position from Merckx who was making a very determined comeback.

One of the first things Paolino did was call his fiancée, Monica. "Monica, I did it!" he yelled down his mobile phone. "It was my day, my dream had to come true. I'd like to thank Tafi, Museeuw, and all of the team who worked so hard for me. I couldn't let them down." "In the sprint I took

off from third position to check out the competition," continued the 26-year-old who has been racing with Mapei-Quick Step since 1999. "The Spaniard took off, suddenly blocking me off and I almost came off the bike. But I really couldn't have gone wrong."

The Liege was Paolino's first success in a World Championship race. It should be remembered that Bettini has already chalked up four other victories this year, including two stages and the final classification in the Trofeo Cecchi Gori.

In 1996, a season when he was competing in the under-23's with the Grassi-Mapei team, Paolino won eight races and came fourth in the World Championship. The following year he turned professional and had one win. In 1999, his first year with Mapei-Quick Step, Paolino clocked up five successes.

## MAPEI-QUICK STEP, 14 GRANDS PRIX AND THREE CUPS

Bettini's skill at Liege saw Mapei's total of World Cup Grand Prix increase to 14. The other 13 victories were as follows: five Paris-Roubaix (Ballerini in 1995 and 1998, Museeuw in '96 and 2000, Tafi '99); two Tours of Flanders (Museeuw '95 and '98); two Tours of Lombardy (Tafi '96, Camenzind '98); two Rochester Internationals (formerly the Leeds International) with Bortolami in '94 and Tafi in '97. The Mapei-sponsored team has also won three individual World Cups: two with Museeuw ('95, '96) and one with Bortolami ('94). Mapei-Quick Step won the Team World Cup in '95, '96, and '98.



Paolo Bettini at the Liege-Bastogne-Liege finish line (left) and raising the Cecchi Gori Trophy (above)



# AN EXPLOSIVE SPRING FOR MAPEI-QUICK STEP

**MAPEI**

**QUICK-STEP**



It really has been full steam ahead for the team sponsored by the Gruppo Mapei in this its seventh season on the professional circuit. On May 6th, the same day on which Andrea Noe triumphed in the most difficult stage of the Tour de Romandie and American Fred Rodriguez took a stage of the Four Days of Dunkirk, their total wins increased to 471, bringing the golden figure of 500 even closer.

World Champion Oscar Freire won the first trial of the Majorca Challenge at Palma.

In the same event, Paolo Bettini followed suit at Puerto Soller. Belgian cyclist Tom Steels is the big "gunner" when it comes to wins in the Mapei-Quick Step jersey, winning a stage of the Mediterranean Tour at La Seyne sur Mer ahead of the great Cipollini.

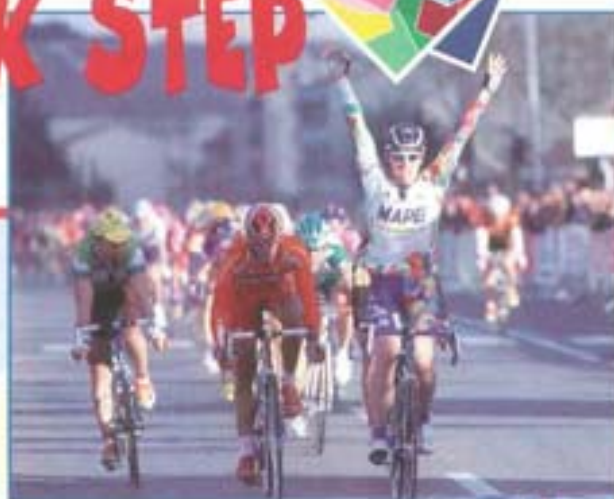
Michele Bartoli also made a welcome return to the winners' podium. Although forced to take a break after fracturing his right knee-cap in a fall during the Tour of Germany on June 2nd '99, Bartoli went on to win a stage of the Ruta del Sol at Benalmadena in Spain, beating team mates Museeuw and Bettini in the process.

The Laigueglia (Liguria, Italy) has proved something of a lucky charm for Mapei. In fact, Daniele Nardello won the Trofeo Laigueglia 2000 on the sprint. He also took the Tour de Haut Var at Drauguignan in France. After Oscar Freire won a stage of the Vuelta Valenciana at Jativa in Spain, the Mapei-Quick Step new professionals made their presence felt in the Tour of Argentina. Hungarian Lszlo Bodrogi came home first in the individual prologue, as did Luca Paolini and Crescenzo D'Amore in the pace line stages. For Bodrogi, Paolini and D'Amore, this was the first taste of success amongst the pros.

Until this year, Johan Museeuw had never won the Het Volk, the opening event on the Belgian calendar, in all of his long and glorious career. Giuliano Figueras, on the other hand, triumphed in the Chiasso Grand Prix.

Tom Steels won the last stage of the Paris-Nice, bringing his total of victories in the race to eight. Tom also won the Nice stage in both '97 and '99 and is the VIP of the Promenade des Anglais.

Freire, 1999's World Champion, won two stages of the Tirreno-Adriatico, at Sorrento and Monte San Giusto, proving himself a real cycling ace. Dutchman Max Van



*Left: Daniele Nardello at the Trofeo Laigueglia finish line.*

*Above: Tom Steels the Mediterranean Tour.*

*Below left: Johan Museeuw wins the Het Volk.*

*Below right: Oscar Freire at the Vuelta Valenciana*

Heeswijk felt the thrill of success in the first two stages of the Portugal-Telecom Grand Prix. The Memorial Cecchi Gori is also becoming a dear friend to Mapei-Quick Step, thanks to Bettini's success not only in two stages but also in the final classification. The young Paolini and Bettini showed great personality with wins in the third and fifth stages of the Tour of Normandy. Museeuw put in impressive wins in Belgium too in the Flèche du Brabant as did Steels in a stage of the Three-Day La Panne. Stefano Zanini won a stage of Tour of the Basque Country at Vitoria (Spain), repeating his performances of '96 and '97. Does this mean that "Zaza" will soon be mayor of Vitoria?

This run of successes continued with Freire's two stages of the Vuelta de Aragona and stages in the Niedersachsen Rundfahrt (Germany): two for Rodriguez and one each for Van Heeswijk and the Belgian Kevin Hulsmann (a first professional win for the newcomer).



# NATIONAL CHAMPIONSHIP:

## MAPEI-QUICK STEP, A RECORD BREAKING 5-STAR PERFORMANCE

The experts say – “you cannot be a professional in sports or in the industrial field if you are not international.” An international philosophy is central to the Mapei Group’s strategy and mission statement. Also the Mapei Group sponsored professional cycling team is multinational both in its personnel and its race program. Winning national Championship jerseys is important in terms of earning recognition for outstanding athletic achievements and in terms of raising the national flags of different countries in which Mapei-Quick Step can develop a market.

Inspired by this principle, in 2000 Mapei-Quick Step has broken another record – it is the first cycling team to have taken five national Championships in just one season. The professional cycling team won the Italian road race Championship thanks to Michele Bartoli; Axel Merckx, son of the legendary rider Eddy Merckx, triumphed in the Belgian Championship; Fred Rodriguez is the American champion and in Hungary the neopro Laszlo Bodrogi walked away with both the national road Championship and the individual time trial.

Michele Bartoli took the first Italian title of his career ahead of Gilberto Simoni and Daniele Nardello, another Mapei-Quick Step team leader, in the race in Trieste, which got under way in diabolical weather conditions, with a gusting Bora wind and a downpour of icy rain. The contenders for the Italian professional title faced the difficult climb known as the “Bivio H” 12 times. At the end of the third circuit Luca Scinto and Andrea Tafi



Quick Step rider, Paolino Bettini, went clear with Contrini. They were caught shortly afterwards by Bartoli, Nardello, Belli, Simoni, Serpellini, Rebellin, Trentin and Simeoni. The situation at the front of the race

changed several times. At the start of the climb at the twelfth circuit, Nardello and Simoni were ahead of Bartoli and Belli by 10". Five kilometres before the finish Belli and Bartoli caught Simoni and Nardello. Then at four kilometres before the finish Michele broke away while Nardello marked Simoni and Belli, both of whom appeared strangely reluctant to react to the move. Bartoli donned the Italian National jersey in

Piazza Unità, and so was able to exorcise the bitter memories of an unfortunate 1999. In fact, during the Tour of Germany on June 2, 1999, he fell and broke his right knee cap and was forced to take a break until the

went clear while the two Mapei-Quick Step team leaders joined a group comprising their team mate Luca Paolini and nine other riders. On the tenth circuit another Mapei-





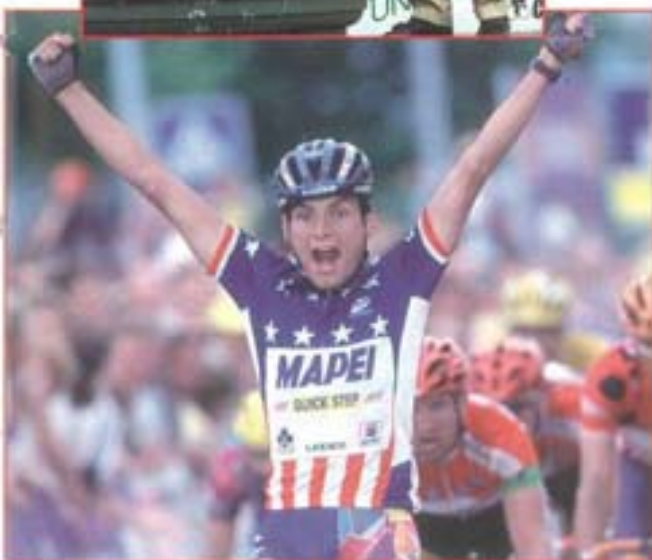
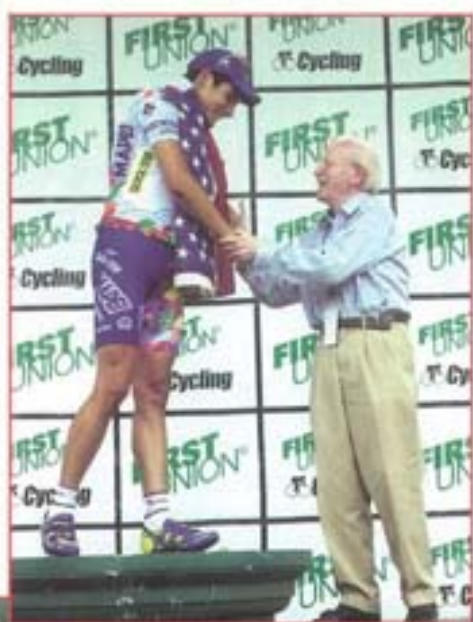


for victory as ever, to second place. Mapei-Quick Step's success was crowned by the sprinter Tom Steels' fourth and the rouleur Wilfried Peeters' fifth place in Belgium. Belgium paid homage in the best possible way to "Merckxino" - Axel received both the trophy and the jersey honouring his victory from King Albert the Second.

Fred Rodriguez won his American Champion's jersey in Philadelphia, prevailing over George Hincapie. At the end of the race, Directeur Sportif of the United States Fred Mengoni, also very popular in Italy, draped Rodriguez in the Star-Spangled Banner. Born in Bogotà, Columbia, in 1973, the eclectic American Rodriguez is one of Mapei-Quick Step's multi-winners in the year 2000.

The Hungarian Bodrogi took two victories in Pecs, but the neopro still has a large margin for improvement, especially in the single day races. Laszlo was already known for his time-trialing ability back in 1997, the year in which he came second in the under 23 World Cup.

No other professional team in this era has won as many National titles as Mapei-Quick Step. The team has won national Championship titles in three continents - Europe, Asia and America. The run of success began in 1994 thanks to Abraham Olano, winner of both the national road race Championship and the individual time trial in Spain. In 1996 Johan Museeuw and Manuel Fernandez Gines won in Belgium and in Spain respectively. In 1997 Mapei-Quick Step enjoyed a quartet of victories with Gianni Faresin (Italy), Steels (Belgium), Oscar Camenzind (Switzerland) and Yoshiyuki Abe (Japan). In 1998 the team "made do" with three road titles - Tafi, first in Italy, Steels in Belgium and Jan Svorada in the Czech Republic. In 1999 Mapei-Quick Step won the Italian points race Championship with Adriano Baffi.



beginning of the 2000 season.

In 1970 Eddy Merckx took the Belgian road race title, while in 2000 his son Axel, who this year is enjoying the best season of his career claimed the red-yellow-black jersey at Rochefort. Particularly impressive was the way in which Axel condemned Frank Vandenbroucke, as strong and hungry

# MAPEI-QUICK STEP

PERFORMANCES WORTHY OF THE WORLD'S  
TOP-RANKED TEAM IN THE GIRO D'ITALIA  
AND THE TOUR OF SWITZERLAND

Stefano Garzelli won the 83rd Giro d'Italia. Andrea Noè came in fourth at 4'58" from the victor and was Mapei-Quick Step's best placed rider on general classification. The



Russian Pavel Tonkov came in fifth at 5'28" from the pink jersey. The team did not finish the Giro d'Italia 2000 with the pink jersey, but found consolation in the stage victories of Axel Merckx and Paolo Lanfranchi, both of whom triumphed in the face of fierce competition on long and demanding courses, evocative of the World Cup classics. Mapei-Quick Step also prevailed in the team general classification thanks to the precious contribution of Rinaldo Nocentini, Paolo Fornaciari, Davide Bramati and the American Chann William Mc Rae. Mapei-Quick Step also won the team classification in 1998.

On the ninth day of the race Merckx emerged victorious from the longest stage of the Giro, a 265 kilometre long roller-coaster ride over the Apennine hills, from Prato to Cornalio. At Prato Axel moved his father Eddy. Indeed, Axel's exploits might even be compared to those of his father in his extraordinary career.

During the stage, the leaders faced the climbs of the Bocca Trabaria, the Valico di Spino, the Consuma Pass and the Vetta le Croci. On the last climb, Merckx was in a breakaway group with Lanfranchi, Gutierrez, Jimenez, Parra, Castelblanco, Sciandri and Filippo Casagrande. Axel's hopes of winning seemed to have disappeared when he fell on the descent into Prato but thanks to an incredible display of physical strength and determination was able to rejoin the leading group at 5 kilometres from the finish line. From 1,200 metres out, he launched a devastating attack finally crossing the line 6" advantage over Sciandri, Filippo Casagrande, Lanfranchi and the others.

Lanfranchi's success came in the Saluzzo-Briancom stage (176 kilometres), on the Italian and French roads which owe their fame to the feats of Coppi and Bartali. It was an extraordinary spectacle. The stage went from the 2,748 metres of the Passo dell'Agnello, known as the "Cima Coppi" - the highest climb of the Giro 2000, to the 2,361 metres of the Izoard. Paolino effectively won two races, one at the finish line and one as Tonkov's domestique "de luxe". Mapei-Quick Step's Italian and

Russian went over the Isoard 35" down on Pantani, Simoni, Garzelli and Francesco Casagrande. On the descent into Briancon, Lanfranchi and Tonkov quickly rejoined the escapees before the latter counter-attacked decisively, several kilometres from the finish in what would prove to be the winning move of the race. Lanfranchi would finally cross the line with an advantage of 54" over Pantani and 1'01 over Simoni, Casagrande and Garzelli.

In the time trial on the penultimate day of the race, Noè (who also won a stage in the Giro of Romandy, Switzerland) took second place from Briancon to Sestriere, gaining three positions in the general classification and overtaking Tonkov in the process.

After the Giro d'Italia, the team with the building block jersey participated in the Tour de Suisse, considered to be cycling's fourth most prestigious stage race after the Tour de France, the Giro and the Tour of Spain. On the second day of the Tour of Switzerland the American Fred Rodriguez inaugurated his national champion jersey winning the Uster-Rheinfelden stage in a bunch-sprint finish and Stefano Zanini won the Herisau-Baden stage. The entire Mapei-Quick Step team, including a rejuvenated Michele Bartoli, contributed to making this edition of the Swiss stage race a particularly electrifying event.

MAPEI  
QUICK-STEP

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