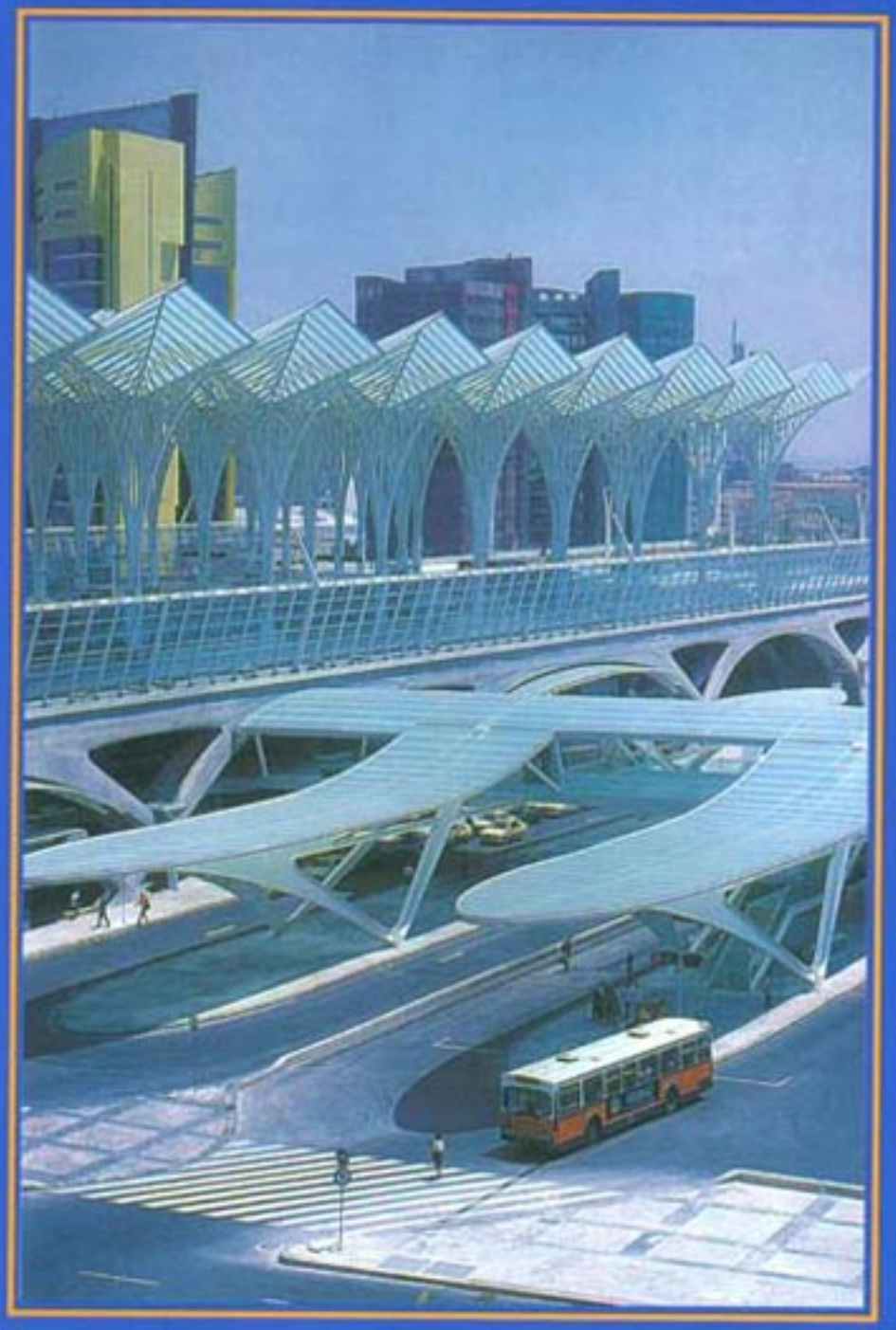
INTERNATIONAL

REALTÁ MAPEI



Estação Do Oriente

Adhesives aweigh

The Mülheim/Ruhr Metro

Ecology first

The Spencer theater

Concrete cover

Mapei global infonet

The flying carpet

Mapei-Quick Step 2000

7

EDITOR Adriana Spazzoli
ENGLISH EDITING AND TRANSLATION Michael Keilly
EDITORIAL ASSISTANT Carla Fini

GRAPHIC DESIGN AND ART DIRECTION Magazine - Milan (Italy)
COLOUR SEPARATIONS AND LAYOUTS Overscan - Milan (Italy)
PRINTING Arti Grafiche Beta - Milan (Italy)

Edited and published by: MAPEI S.p.A.
via Cafiero, 22 - 20158 Milan (Italy)
tel. ++39/02/376731 - fax ++39/02/37673214
INTERNET: http://www.mapei.it
E-mail: mapei@mapei.it

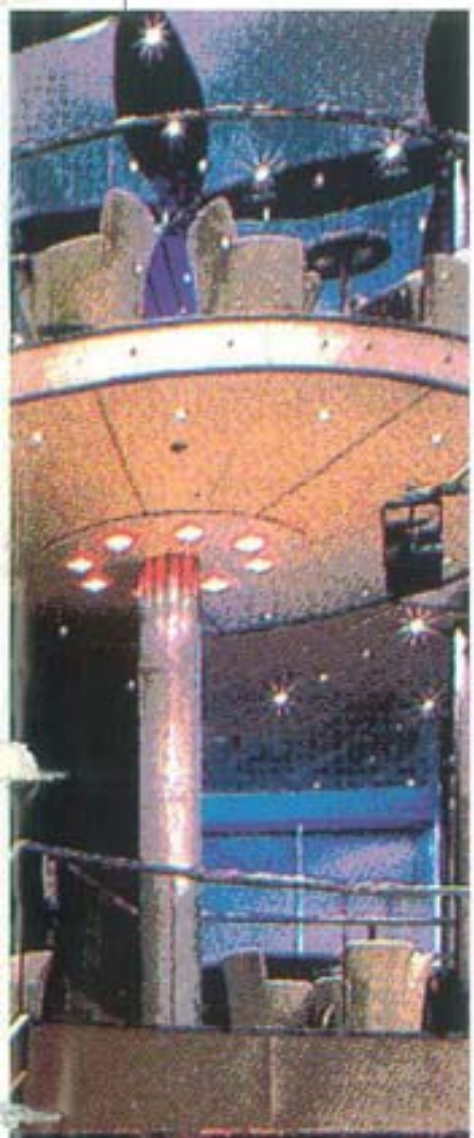
EDITOR/EDITORE MAPEI S.p.A.

Realtà Mapei - Bimonthly magazine - Registered by the Tribunal of Milan n. 363/20.5.1991
Realtà Mapei International is published 4 times per year

Main cover photo: the Lisbon's East Station (article on page 23)

Articles appearing in this magazine may be reproduced in whole or in part after obtaining the permission of the publisher. However, the source must be cited.

SUMMARY



EDITORIAL

Without research there is no future page 2

NEWS

Environmental award page 3
Mapei Global Infonet page 55
Six research scholarships inside back cover

TEAMWORK

Mapei in Germany page 4

PROJECTS

Adhesives aweigh page 10
The Mülheim/Ruhr metro page 16
The Three Crowns page 20
Estação do Oriente page 23
The SpencerTheater page 35
A labor of love in Etiopia page 38
Bucarest, babies in arms page 40
A successful operation page 44
Five star renovation page 52
What a difference a night makes page 56
Hotel Casale page 60
The flying carpet page 64

RESEARCH

Adhesives with very low emissions of volatile organic compounds page 28
Ecology first page 32

PRODUCT SPOTLIGHT

Zero-risk adhesives page 31
Silexcolor and Silexcolor Tonachino page 66

CONCRETE TECHNOLOGY

Concrete cover page 42
BIBM '99 page 48

TRADE FAIRS

Taking a stand for the future page 49

EXPERT OPINION

Porcelain tiles in heavy traffic areas page 58

MAPEI SPORTS DIVISION

From the Giro to the Tour to the Vuelta page 68
Still in the lead page 69
On the right track with Baffi page 71
Mapei-Kona still queen of cross-country page 72
Mapei and Australia: a winning team page 72
Mapei-Quick Step 2000 page 73

WITHOUT RESEARCH THERE IS NO FUTURE

In 1911 Ernst Solvay, the Belgian industrialist who invented the process for manufacturing soda, demonstrated the enormous confidence he had in research when he invited eleven Nobel prize winners to be members of his company's scientific board, including Albert Einstein and Marie Curie. Ernst Solvay knew that investing in research means investing in the future.

We know that the opposite is also true: that without research, there is no future. Today, however, European chemists are losing ground to their non-European colleagues, as can be seen below:

NOBELS / CHEMISTRY	1901-1950	1951-1970	1971-1998
EUROPEAN	43	17	17
NON-EUROPEAN	7	12	35

In Italy the situation is even more cause for concern, as revealed by statistics indicating a dwindling proportion of researchers, patents and high-tech exports. Italy made great sacrifices to join the European Monetary System, and yet, having done so, the fact remains that the European Union has the world's lowest economic growth rate, and therefore a precarious future.

In 1998 Italy's labor unions agreed to new contracts with management that brought down the cost of labor by two or three percentage points. This act of good faith, however, did not make Italy much more competitive with, for example, the Far East, where labor costs are one-tenth Italy's, nor with Eastern Europe, where labor costs are one-third, nor even with the United States, where labor costs are approximately 16% less than Italy's, taxes and contributions much lower, and flexibility total. Yet Italy's situation is not far removed from that of France and Germany, the EU's two largest economies.

Despite the recent crisis, the Far East remains the area with the world's greatest growth potential. To enable the countries of the European Union to remain competitive in the long run in the global economy, lowering the cost of labor alone would not suffice. In order to create jobs and profits, the EU needs to create growth opportunities through technological innovation: thus the importance of research. The EU needs industrial policies that encourage investment in research and development, possibly in the form of tax or other incentives for hiring researchers, as well as personnel for quality management programs, ecological innovation, planning, and marketing, i.e. all of the non-material assets that make companies, and economies, successful.

Like Ernst Solvay, we at Mapei are firm believers in research. For many years we have invested 5%* of our annual revenues (in 1999, almost LIT. 1 trillion=$558.6 million USD) in research and development, and increased our workforce worldwide to 1,500 employees, of whom 12% are employed in research. Our commitment to research led to the development of our ECO line of environmentally sensitive adhesives. We have led our industry in obtaining ISO certification for our Quality Management and Environmental Management Systems, our participation in the Responsible Care and Open Factories programs, and our strong health, safety and environmental policies. Our largest plant in Robbiano di Mediglia (Milan), Italy is certified by Certieco for its ISO 14001 Eco Management System and has been entered on the EMAS (the European Union Environmental Management and Audit Scheme) list of EU manufacturing facilities cited for environmental excellence. This is the EU's most coveted and prestigious environmental acknowledgement. Mapei's commitment to quality led to ISO 9001 Certification of Mapei operations in Italy in 1994, Vinavil in 1995, Mapei Canada in 1996 and Mapei France in 1998, as part of an ongoing quality certification process that will include all Mapei subsidiaries worldwide. Being out front in research and development has made Mapei a success worldwide, and only by staying out front in these crucial areas can we retain our competitive edge in the global economy.

Giorgio Squinzi
President, Mapei Group

ENVIRONMENTAL AWARD

The Second National Congress of the National Inter-University Consortium, entitled "Chemistry for the Environment" took place in February of this year in Venice, Italy, during which awards were given for "Clean Chemical Products and Processes". Mapei was among the chemical manufacturers honored for developing chemical products that respect the environment, specifically for Mapei's "Adhesives with extremely low emissions of volatile organic compounds (VOC)". Accepting the award for Mapei was Dr. Roberto Leoni, the company's Safety, Environmental, and Special Projects Manager, who read a report on the subject for the occasion.

The ceremony was held in St. Margaret's Auditorium of Cá Foscari University in Venice and was attended by representatives of the academic world and government institutions, such as Professor Pietro Tundo of Cá Foscari University and Director of the I.N.C.A. Consortium, Prof. Ferruccio Trifirò of the University of Bologna, Dr. Paul Anastas of the EPA; the U.S. Environmental Protection Agency, Dr. Giuseppe Puglisi of the Executive Board of the Italian Ministry of Industry, Prof. Alessandro Di Domenico, Director of the Italian Health Research Institute, and Dr. Gianni Perini, Director of the Marghera Industrial Area Reclamation Project of Italy's Veneto Region.

The text of Dr. Leoni's report is printed on page 28.

Roberto Leoni (left) being congratulated at the awards ceremony by Prof. Ferruccio Trifirò (right), with Prof. Pietro Tundo (center).

At the top of the page, the environmental award that was presented to Mapei.

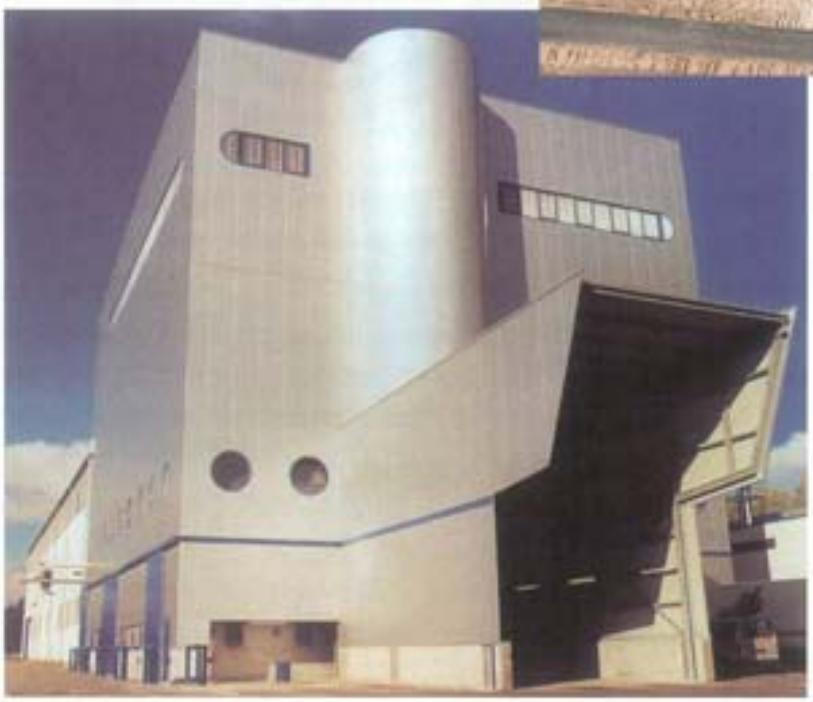
MAPEI IN GERMANY

With an annual production capacity of 300,000 metric tons, Mapei's new plant in Weferlingen, Germany is the Mapei Group's second largest. Mapei's goal is to cover 10% of the German market.

by Alberto Mazzuca

"The die is cast," exclaimed proudly Hans Dieter Albreit, General Manager of Mapei GmbH, on 18 October 1999 at the official inauguration of the Mapei's Group's newest manufacturing facility in the small town of Weferlingen between Hanover and Magdeburg in the Saxony-Anhalt region of the former East Germany.

Built with an investment of approximately LIT. 50 billion in three years with an additional 30 billion lire budgeted for the sales and technical service network, the plant is situated on an 8,000 square meter site, including a 1,700 square meter production floor and 200 square meters of laboratory and technical space. Already in operation for a year, the plant is one of the most technologically advanced of the Mapei Group with an annual production capacity of 300,000 metric tons. It currently accounts for 70% of Mapei products sold in Germany and by the end of 1999 is expected to account for 80% Mapei GmbH's revenues. "We couldn't stay far away from a market like this," declared Giorgio Squinzi, President of the Mapei Group, who for years has pursued a well-focused policy of capitalizing on the opportunities offered by market globalization. Since the German market for chemical products for construction is the largest in the world, with a volume of DM 2 billion a year, (approximately LIT 2 trillion), Mapei decided to move its operations closer in. Until the plant went on line the Mapei products sold in Germany were supplied by its plants in Italy, Austria, and France, but now all of them will be able to have "Made in Germany" printed on them. "Our goal," says Squinzi, "is to cover 10% of the German market."



Already operative since 1998, the Weferlingen plant was officially inaugurated in October 1999. Above, a moment of the inauguration day: from the left, Hans Dieter Albreit, the minister of Saxony Anhalt Reinhard Höppner and Giorgio Squinzi during the opening ceremony.

The day of the inauguration was a warm one for the month of October. The private plane flying the Squinzi family and fifty Italian guests including customers, journalists and Federchimica employees was forced to circle the airport for almost an hour in heavy fog before being able to land on the third attempt, to the passengers' great relief. As a result the day's events scheduled by Albreit and plant manager Klaus Wilwacher got a bit of a late start. But the authorities and the other two hundred guests already present in the new plant's vast warehouse, gaily decorated for the occasion, didn't seem to mind. On hand were the minister president of Saxony Anhalt, Dr. Reinhard Höppner, its Secretary of State Nagel, Italian economic attaché Beltrame, Mayor Tober of Weferlingen and Mayor Fucke of Walbeck, along with customers, suppliers, bank and insurance executives, and architect Rainer von Lamatsch-Kaempfe of the architectural firm of Lamatsch-Kaempfe, Peter Westrup & Partners of Frankfort, who

designed the plant. An Italian orchestra played while a troop of actors in imaginative costumes performed a folk-ballet.

Dr. Höppner praised the Mapei Group's decision to invest in the construction of the new plant that resulted in the creation of 23 new jobs in the economically depressed region. "This kind of investment," the premier emphasized, "can attract other companies to the area." Saxony Anhalt has one of Germany's highest unemployment rates and has already welcomed other Italian investors, including the Ausimont and Radici corporations who were also given tax incentives to build factories. Giorgio Squinzi discussed the reasons for siting the German plant in Weferlingen. "The permits were granted in only 60 days." We also found the local authorities to be extremely cooperative. We were given tax incentives equivalent to 35% of our investment." Two other reasons that were decisive factors in choosing Weferlingen: first, its proximity to Sand-und-Tonwerke Walbeck GmbH. The company produces the very pure silica sand that is used as a raw material in Mapei products, and secondly, the very central location. "We are finally in a position to optimize our distribution in Germany," declares Albreit.

Mapei GmbH was founded in Leipzig in 1992 shortly after the reunification of the two Germanys. But it was only in 1995 that following a detailed analysis of the German market, the Mapei Group decided to implement more fully a part of the Mapei philosophy that has already proven successful all over the world , i.e. Mapei is Italian in Italy, American in the USA, and German in Germany. Instead of having to supplying the German market with products from the Robbiano di Mediglia plant in Italy, Traismauer in Austria and Montgru Saint Hilaire in France, Mapei would be able to manufacture directly in Germany. The cornerstone of the plant was laid in December 1997 in the presence of the then economic minister of the region, Klaus Schucht. The first bag of powder came off the conveyor belt on 7 November 1998. Today Mapei GmbH employs a total of more than a hundred people at its five locations: the Weferlingen plant, the headquarters in Erlenbach in the Rhine-Main region, the Technical Service in Bottrop and warehouses in Berlin and Neuss. The new Weferlingen plant contains the latest quality control equipment for both raw materials coming in and finished products going out. A research and development center is also planned for Weferlingen that will bring the number of the Mapei Group's R&D facilities up to six.

Mapei GmbH has applied for ISO 9001 certification, which has already been obtained by Mapei operations in Italy, Canada and France. "Having a certified qualified system," says Adriana Spazzoli, Marketing and Communications Manager of the Mapei Group, "is as much part of the Mapei philosophy as is our commitment to protecting the environment." The Weferlingen plant is equipped with the most modern filter systems for the aspiration of powder and proximity to the source of 60% of the plant's raw materials reduces both traffic congestion and air pollution.

Albreit, who has been with Mapei since 1995, explains, "Since the German construction market is Europe's largest, local manufacturers have always tried to make it difficult for foreign firms to penetrate, erecting barriers that were more or less effective. However, Mapei managed to circumvent them with a philosophy that's always proved to be winning one everywhere it operates: being Italian in Italy, American in the USA, and German in Germany, etc."

Has this strategy proved effective in Germany as well?
Definitely. The first batch manufactured in Weferlingen was dated 7 November 1998, which is not very long ago at all, and already our being able to manufacture in Germany has had a positive effect on sales. We're sure that with a sales budget of more than 45 million marks we'll be able to increase our sales by over 40% in 2000.

Give us a profile of Mapei Deutschland.
At the moment we have 110 employees, fifteen of whom work in the new Weferlingen plant. We have twenty-three sales reps for ceramics and resilients and one for admixtures, along with twenty people in the Technical Service. The rest work in the marketing, administrative and sales offices, and in the three warehouses in Berlin, Leipzig and Neuss.

The plant is on the former border between the two Germany's. How have the enormous economic and cultural changes brought about by reunification affected you?
Our investment in Weferlingen was a big step for Mapei Deutschland. Our being located in Saxony-Anhalt, between Magdeburg and Hanover to be exact, will certainly help promote the Mapei name in the "new" parts of Germany. And we found the work force there to be every bit as qualified as that of the rest of the country.

But unemployment is still rather high, isn't it? What effect has reunification had on construction?
Unemployment in 1998 is the highest it's ever been in Germany: 4.4 million unemployed, which amounts to 11.4% of the workforce. So it's difficult to make forecasts for the future, the building industry included, where business has been slow for the last three years, with unemployment relatively high, as it is in other sectors of our economy.

Erlenbach headquarters

Do you still have many foreign workers in Germany?
Of course. Salaries are high in the construction business, so foreign workers make up a large part of the workforce. We have not only have workers from other countries in the European Union on most construction sites in Germany, but many from Eastern Europe as well.

Explain to us what the building market is like in Germany. Is there more private building going on than infrastructure projects like bridges and roads? And also, is there more demand for new construction or for remodeling?
The German building market is worth 200 billion Euro, of which 70 billion are in residential construction and 40 billion in commercial building, totaling 50%. Another 70 billion are public works projects, or 35%, and remodeling represents around 15%. The need for new

PROFILE OF MAPEI DEUTSCHLAND

Employees: 110
Headquarters: Erlenbach
(E-mail: mailto@mapei.de)
Technical Service Office: Bottrop
Warehouses:
- Berlin
- Lipsia
- Neuss

Plant: Weferlingen

WEFERLINGEN TECHNICAL DATA

The plant is built on an 8,000 sq m parcel of land divided into:

300 sq m	offices
3400 sq m	finished product warehouse
approx. 200 sq m	laboratory and technical center
1,700 sq m	production floor
over 700 sq m	storage silos
1000 sq m	covered, heated roadways for moving, loading and unloading merchandise

Plans are in the works to enlarge and modernize the plant's link to the railway network in order to take greater advantage of this environmentally friendly means of transport.

January 1999: the Mapei GmbH sales force

construction in the former East Germany accounts for the percentage of new buildings being much larger than that of remodeling.

How do Mapei's four product lines fit into the picture?
Presently our sales consist of 50% ceramic line products, 35% resilient, 8% building specialty line, and 7% admixtures, which is also the breakdown of the 1999 Mapei Deutschland sales budget.
Does Mapei Deutschland sell to the DIY market?
Not at the moment. But we can see a lot of growth potential there for our products. Keep in mind that 45% of ceramic tiles sales in Germany are made through DIY outlets, so there is a demand for our products. However, we are developing a concept for the DIY market which has to be different from the approach we take to the professional market.

Are all the Mapei products sold in Germany manufactured in the Weferlingen plant?
We only manufacture powder products in Weferlingen. From Mapei in Milan we buy only epoxy resin and silicone-based adhesives for resilients. But the fact that Weferlingen has such a high production capacity means that we can reduce the pressure on production in the other plants which up until recently had to manufacture everything we sold in Germany. I'm referring to the plants in Robbiano di Mediglia in Italy, Traismauer in Austria and Montgru Saint-Hilaire in France. Our plant frees the others up to concentrate exclusively on the needs of their own countries.

Let's project a little forward into the future. Is there any possibility of expanding sales into Northern Europe?
For right now Mapei Deutschland is concentrating on the German market. We are still busy pursuing our strategy for becoming one of the leading German manufacturers in various areas. It's an important strategy: our potential total of the German building market is over 5 billion marks. But sooner or later we may possibly expand toward the northern European market.

Germany's supremacy in chemistry is famous the world over. How are Mapei's chemical products thought of in Germany?
Mapei's policy is to achieve the highest standards of quality and this policy satisfies the most important requirement of the German market. After an initial introductory phase that was facilitated by Mapei's excellent reputation internationally, the public is convinced that the quality of our products is good and in many cases better than that of our competitors.

Mapei has always placed a lot of emphasis on training, and in Germany there are very highly qualified professional schools for the building trade. How does Mapei Deutschland handle training?
Information and training for ceramic and resilient installers are a very important part of our strategy. In 1998 we held courses for more than three thousand installers with seminars, product presentations and technical training courses. Our Technical Assistance reps hold classes in various technical institutes and we also work with the associations of natural stone installers. All in all, we put a lot of effort into our training programs.

How do you handle a sensitive area like

December 1998: the first bag of ADESILEX P9 makes its debut

Training courses are held by the staff of the Technical Service Department (working out of their office in Bottrop, Germany) using demonstrations and technical literature.

ecological products, especially considering that the German market is very attuned to this type of product?
It's true that respect for the environment is very high in Germany. The advanced technology of the new ULTRABOND ECO product line gives us great possibilities for growth in this direction since it places us in a position of primary importance on the German market.

Let's move on to talk about certification. Do products sold in Germany have to comply only with international standards or are there also special German market regulations?
We have a common market and a single currency but most of the European Union countries still have their own standards, including Germany. International standards have been introduced and are being complied with, but products also have to measure up to stricter German standards, especially for construction materials and admixtures. For more than two years we have been working to have our products certified and are sure that we can meet the German standards, as we did with our MAPEFLUID X404 admixture for concrete and, of course, our powdered products for ceramic tile installation.

Two important trade fairs were recently held in Germany, Domotex and Bau. What results did Mapei Deutschland achieve?
We had an excellent response from our customers that confirms we're on the right road. We never had so many visitors as we did this year. And we also made contacts with important new distributors, architects and contractors. The new products we presented, ULTRABOND ECO at Domotex in Hanover and the MAPEFONIC SYSTEM at the Bau trade fair in Berlin, also got a terrific response, as did the other Mapei products.

FOR YOUR INFORMATION

"From pro to pro" is the name of the publication that Mapei GmbH distributes to its customers. Each issue contains specific solutions to construction problems with the motto "on the German market, safely, soundly and ecologically!" In addition to this publication Mapei GmbH is about to publish a new series entitled "Spectacular projects". Issue number one will feature "Mapei products for tunneling".

PORTFOLIO

Motorship Deutchland
Ceramic and natural stone installation in bathrooms, swimming pools and fountains with KERALASTIC, GRANIRAPID, MAPELASTIC, MAPEGUM, grouted with KERAPOXY AND ULTRACOLOR

Sachsen-Allee shopping center in Sachsen
Installation of percelain pavers with ADESILEX P4 grouted with KERACOLOR

Metro U-Bahnhof Stadtmitte in Mülheim
Granite and natural stone installation with PLANICRETE, GRANIRAPID, PRIMER G, ADESILEX P9 grouted with ULTRACOLOR

Allwtterbad swimming pool in Schwerte
Installation of percelain pavers with GRANIRAPID grouted with KERAPOXY

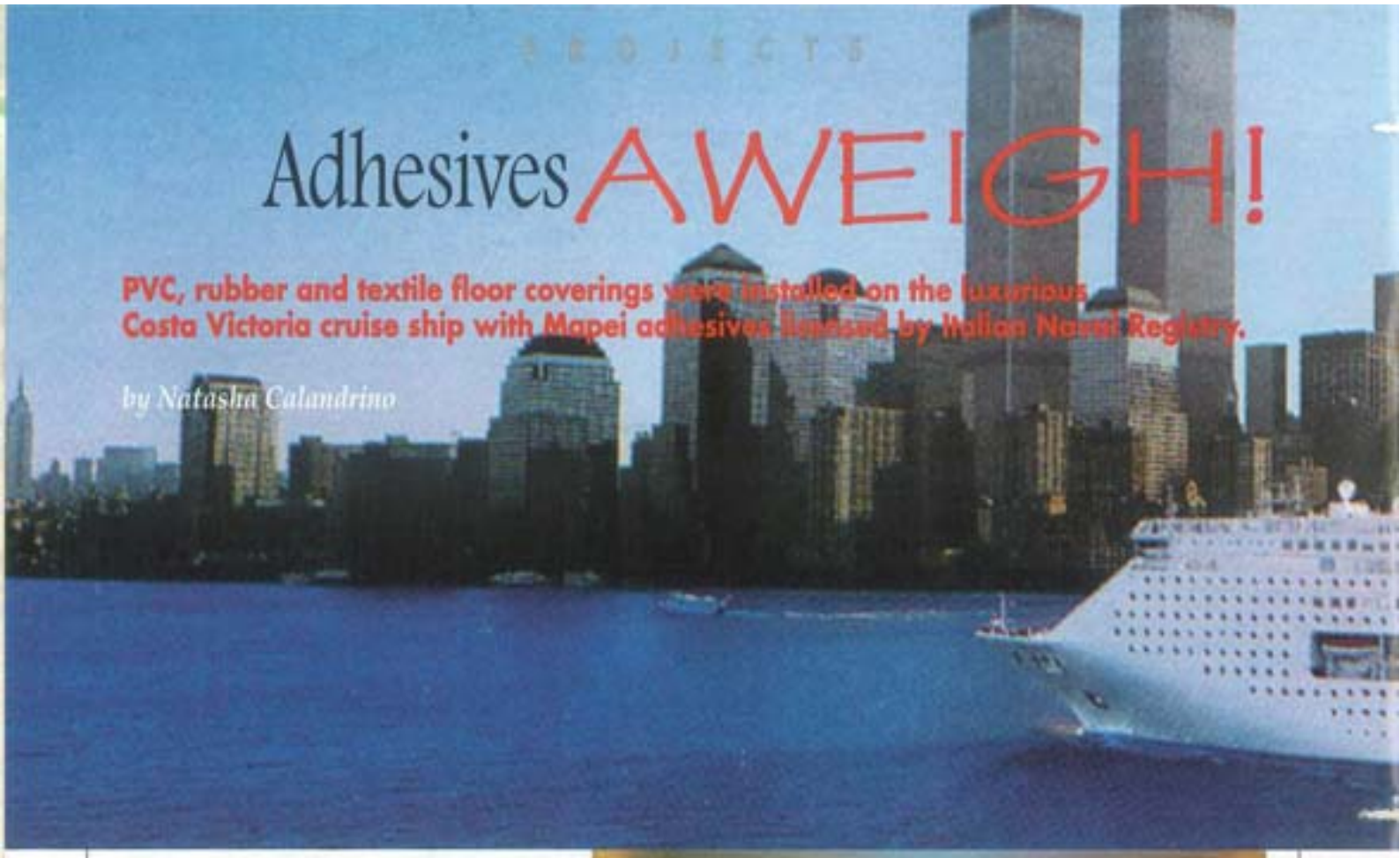
Preußen Museum in Wesel
Installation of natural stone with GRANIRAPID grouted with ULTRACOLOR

Audi Center Car Showroom in Flensburg
Installation of percelain pavers with ADESILEX P4 on screeds made in MAPECEM

Adhesives AWEIGH!

PVC, rubber and textile floor coverings were installed on the luxurious Costa Victoria cruise ship with Mapei adhesives licensed by Italian Naval Registry.

by Natasha Calandrino



What's the latest trend in travel? Cruising around the North Pole on a converted Russian icebreaker? Or a transatlantic crossing, now back in fashion after the film Titanic, with return by Concorde? Whatever the destination, cruises are enjoying a real boom. "Shipboard holidays that once only the rich could afford are now popular entertainment," explains Lorenzo Costa, Marketing Director of Costa Cruises, Europe's leading cruise operator. Television and the big screen have helped promote the romantic, glamorous image of these floating hotels.

New ships are launched every year, each more elegant and hi-tech than the next, and all of them designed to offer passengers a superior level of comfort with a wide range of high level attractions and services.

PHOTO 1

A luxurious flagship

Designed to accommodate sun-worshippers wending their way through the Greek islands or the Caribbean, the 76,000-ton Costa Victoria is 251 meters (820 ft) long and was built in a record 603 hours (only 25 days!) in the Lloyd shipyards in Bremen, Germany.

Its 40,000 square meters (430,500 sq ft) of space are filled with the latest in stylish interior design and furnishings. Built to delight even the most demanding public, the Costa Victoria was first conceived on the drafting tables of well known architects Pierluigi Cerri of the Gregotti and Associates Studio in Milan, Italy, and Ivana Porfiri and Robert Tillberg of the Tillberg Studio of Vicken, Sweden. They outfitted the ship with a two-level theater, two restaurants, a pizzeria, several bars, boutiques, a library, a beautifully equipped spa with swimming pool, a solarium, discotheque, casino, a children's game room, conference rooms, party rooms and a piano bar.

PHOTO 2

PHOTO 3

Certified adhesives

It may seem like a contradiction, but one of the biggest dangers on board a floating hotel is a fire breaking out. In order to prevent flames from spreading in case of fire, all materials used for the finishings and their respective adhesives had to be licensed by the Italian Naval Registry (INR). Mapei was able to offer several installation solutions in various areas on the ship.

In the 2,250 passenger cabins as well as in the public spaces (boutiques, lounges and the largest floating gambling casino in the Mediterranean) the floors were covered with an elegant, creatively patterned carpet installed with AQUACOL T*, a synthetic polymer-based water dispersion adhesive that met the high standards of the Lloyd shipyards (Photos 1, 2, and 3). AQUACOL T is non-flammable and contains no harmful substances, so it is ideal for areas such as these with strict fire resistance classifications.

The steel-plates forming the subfloors were covered with lightweight concrete screeds that were then treated with PRIMER G*, a synthetic resin-based water dispersion primer. Solvent-free AQUACOL T was used to install a total of 18,600 square meters (200,000 sq ft) of carpet. AQUACOL T dries in about 24 hours and forms a flexible film that can withstand intense passenger foot traffic and wheelchair traffic.

Another adhesive, ADESILEX V4*, was used to install PVC flooring on the bridge. The special properties of this solvent-free acrylic water dispersion adhesive enabled 17,200 square meters (185,000 sq ft) of PVC to be installed extremely easily. ADESILEX V4 is a contact adhesive with high bond strength and cohesion. Like AQUACOL T, ADESILEX V4 is non-flammable and contains no harmful substances, thus meeting INR specifications. Since flooring in the entrance foyers and the service areas used by the 800-strong crew is subject to frequent contact with water, it was installed with

ADESILEX G19* two-component polyurethane adhesive for rubber, PVC, and linoleum. ADESILEX G19 hardens without shrinkage and is highly resistant to moisture and water.

Marble adhesives

Adjoining the thousands of square

PHOTO 7

PHOTO 8

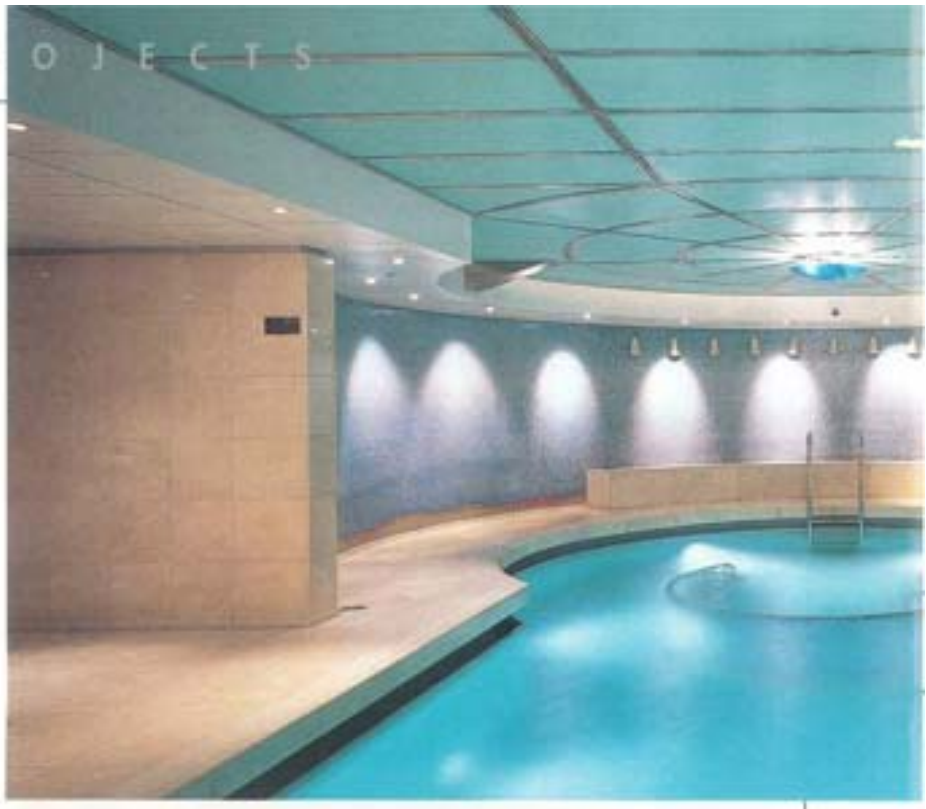
meters of resilient flooring and, in some areas, on top of it, precious marbles were used to add a touch of refined elegance, drawing passengers into a sumptuous reception area whose floors and walls are covered with beige Filetto Hasana marble (Photo 4). A dramatic staircase covered with Crema Marfil marble (Photos 5 and 6) guides passengers to their cabins or suites where they can refresh themselves in luxurious bathrooms decorated in Rosa Portogallo marble (Photo 7). When the ship weighs anchor, passengers can shop in the chic boutiques furnished with crystal-columned showcases rising from bases of Verde Vecchia Chiesa marble (Photo 8), the same marble used on the pilasters flanking the displays (Photo 9). Vacationers can pamper their bodies in the Pompeii Fitness Center (Photo 10), or splash in the heated pool (Photo 11) surrounded by walls of Crema Marfil marble.

Life on board continues far into the night at the "Capriccio" bar whose curved wall is covered in Azul Macabas marble (Photo 12), as are the walls of the staircase to the upper decks (Photo 13). In the Concorde Plaza lounge on the prow, passengers gaze at the sea through majestic windows as they tap their feet to the rhythm of a live orchestra. The centerpiece of this high-ceilinged, luxuriously carpeted salon is a marble inlay of Filetto Hasana, Noir St. Laurent and Calacatta Vagli marbles (Photo 14).

All of these rich marbles were installed with GRANIRAPID*, a two-component fast-setting and hydrating adhesive

PHOTO 9

PHOTO 10



system that makes installations ready for traffic in only 24 hours. GRANIRAPID is virtually shrinkage-free with high bond strength on all normal substrates and excellent resistance to impact, vibration,

PHOTO 12

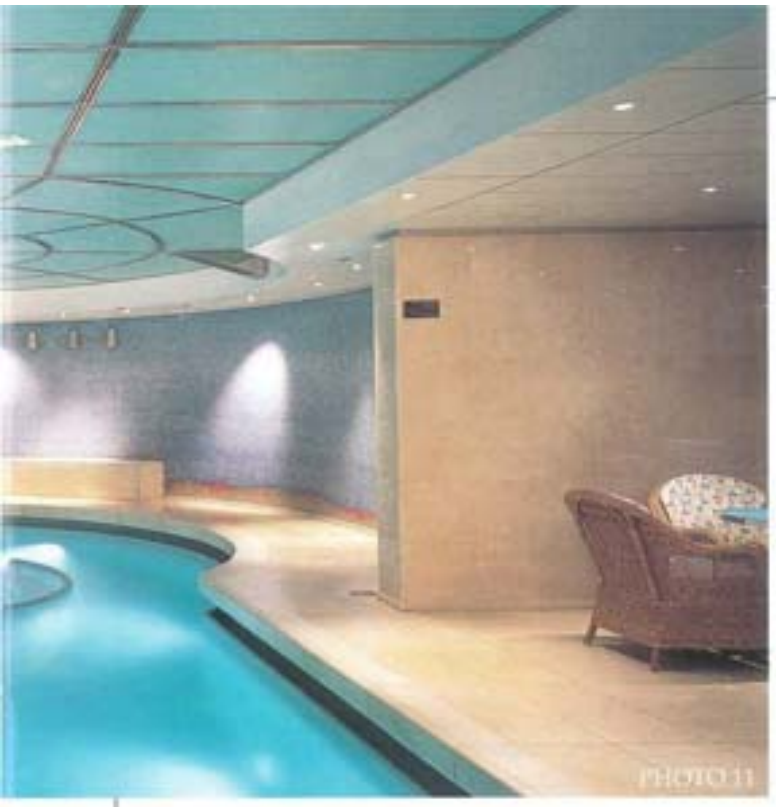
PHOTO 13

thermal shock and aging. The marble was grouted with KERACOLOR FINE GRAIN* (for joints 0-4 mm wide) or ULTRACOLOR* (2-20 mm), depending on the size of the slabs. These durable, high strength color-fast grouts do not form surface efflorescence. The marble-covered surfaces were so large that they required expansion joints sealed with MAPESIL LM* (Photo 15), an odorless solvent-free silicon sealant that is especially recommended for acid-sensitive surfaces like marble. MAPESIL LM seals remain unaltered over time, even when exposed to severe weather conditions, thermal shock and water, and remain flexible at temperatures as low as –50°C and as high as + 120°C.

Smooth sailing!

PHOTO 14

The technical data sheets for the products mentioned in this article are contained in Mapei binders No. 1, "Ceramic Tile Installation products" and No. 2, "Resilient Flooring Line"



TECHNICAL DATA

S/S Costa Victoria

Shipyard: Bremen, Vulkan Group (Bremerhaven), Germany

Built: 1996

Architects: Pierluigi Cerri and Ivana Porfiri, Gregotti and Associates, Milan, Italy, and Robert Tillberg, Tillberg Studio – Vicken, Sweden

Commissioned by: Costa Crociera S.p.A., Genoa, Italy

General Contractor: Saathof Fussbodenbau GmbH Klingenberg, Germany

Gross tonnage: 76,000 tons

Materials used: *carpet:* Dansk Wilton and Due Palme; *rubber:* Mondo; *PVC:* Forbo; *marble* (Azul Macaubas, Filetto Hasana, Noir St. Laurent, Calacatta Vagli, Verde Vecchia Chiesa, Crema Marfil, Rosa Portogallo): supplied by Technostone.

Mapei products for carpet:*
PRIMER G
AQUACOL T
Mapei products for rubber:*
ADESILEX G19
Mapei products for PVC:*
ADESILEX V4
Mapei products for marble:*
GRANIRAPID
ULTRACOLOR
KERACOLOR FINE GRAIN
MAPESIL LM

*The products mentioned in this article are manufactured by Mapei in Europe.

Mapei Coordinator: Mapei GmbH (Germany) Technical Service

THE MÜLHEIM/RUHR METRO

Building two stations of the Metro system in Mülheim/Ruhr, Germany, provided an opportunity to use installation systems that guarantee top quality results.

by Andreas Poitz

Increasing traffic in metropolitan areas has led many cities to build underground mass transit systems. Designing an infrastructure that can absorb a large flow of passengers involves creating interior spaces that must be not only highly functional but attractive enough to distract passengers from potentially negative feelings induced by being underground. The stations must be designed to have a positive emotional impact through visual elements that:
- safely channel the flow of passengers;
- provide quick access to platforms;
- define hazardous areas (platform edges).

When the basic elements of form, light and color are harmoniously combined, all of these prerequisites can be satisfied. The intelligent use of products and materials is essential for the final effect. Besides steel, glass, concrete, brick and various synthetic materials that are often used structurally, floor and wall coverings in ceramic tile and natural and semi-natural stone are widely used for decoration.

Technical prerequisites

A fundamental prerequisite for building the Metro project was bonding floor and wall coverings, screeds, plaster and leveling compounds to the bearing structure securely and durably. When using "noble" materials such as natural or semi-natural stone, there are some purely technical aspects to be taken into consideration, such as their tendency to discolor or potential dimensional instability. For this reason high quality setting materials are needed that:
- can be used even at low temperatures for faster completion times;
- prevent water from seeping in from the bearing structure;
- stand up to heavy passenger traffic;
- resist chemical cleaning products.

Mapei has developed a series of products that meet these prerequisites, from the substrate on up. A significant example of the application of this cycle of high performance products is the Metro line in Mülheim/Ruhr, Germany.

Better bonding

Because they are built in the early stages of construction, substrates are frequently not suitable for the kind of flooring to

be installed over them much later on. Flooring needs special substrate preparation that is determined by the building materials used and the covering to be installed over them. In the Mülheim/Ruhr Metro the screeds were bonded to the concrete substrate with PLANICRETE*, a synthetic latex that improves bonding to all surfaces when added to cement-based mixes. It makes concrete more watertight and increases flexural strength and resistance to freeze-thaw cycles (Photo 1, page 18). PLANICRETE was also used as a bonding slurry. Various cementitious adhesive systems were used in the Mülheim/Ruhr Metro stations, depending on the type of floor or wall covering: GRANIRAPID, ADESILEX P9 and KERAFLEX*.

Living materials

Stone is often used as a design feature in Metro stations. It

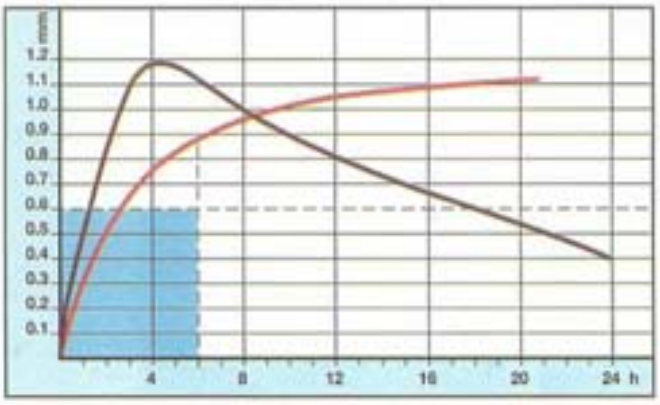
seems to have a life of its own, as can be seen when it is installed: it can discolor, stains can appear on the surface, and dimensional instability can result in cracking or warping. This is caused by the moisture that acts on the back of the slabs during setting.

In order to avoid damaging these materials Mapei has not only developed safe, high performance products but even a method of determining to what degree each variety of stone is sensitive to moisture. A simple, precise test indicates the deformations caused artificially on stone over time. Over 1,200 types of stone were tested with this method and were subdivided into three different groups according to their degree of sensitivity.

It was also found that materials of the same type can vary in behavior when originating from different quarries or in different stages of evolution. The setting method recommended for preventing defective installations can be determined according to the grouping. Besides physical behavior, the Mapei Research and Development laboratories also analyzed the crystal structure of individual types of stone: the grain of the stone's crystal structure and its color turned out to be important criteria for measuring dimensional stability and the tendency to discolor.

These analyses enabled Mapei to offer the best setting methods for the Mülheim/Ruhr installations even in the difficult climatic conditions of underground construction. After preparing the substrate as described above, GRANIRAPID was used to set the Rosa Forte, Bianco Cristal and Branco Perola granite on the floors and walls (Photo 2). GRANIRAPID is a fast-setting and hydrating two-component adhesive system developed in the Mapei Research and Development laboratories that is ideal for setting even large slabs of moisture-sensitive materials like natural stone that require a fast drying adhesive.

Warping in stone/time



Not just for stone

A bond coat of PLANICRETE was applied over approximately 400 square meters (4,300 sq ft) of sanded concrete walls and columns, followed by a coat of NIVOPLAN leveling mortar. (Photo 3). PRIMER G was then applied, over which mineral fiber panels (Photo 5) were installed. PRIMER G is a synthetic resin-based water-dispersion primer that improves bonding. (Photo 4). These panels were then covered with 5x24 cm (2"x9.5") glazed ceramic tiles using ADESILEX P9, a powdered cementitious super-adhesive. When mixed with water, ADESILEX P9 forms an easily worked, very thixotropic mortar with high bond strength that can be applied on vertical surfaces without running or sagging.

KERAFLEX was used to set the 11.5x24 cm (4.5"x9.5") clinker on the floors. KERAFLEX is a ceramic tile adhesive whose high bond strength and moderate flexibility make it ideal for installing flooring subject to heavy stresses like those in the Metro stations (Photo 6).

Grouted granite

Planning expansion joints and the proper grouting of the joints complete the look and determine the ultimate strength of the covering. Floor and wall coverings in metro stations have various performance requirements: the choice of a material, where it is used, and the stresses the material must bear, are the decisive factors in designing the performance profile of the grout. Generally metro station installations need grout that:

- has high mechanical strength;
- is stain-resistant;
- is color-stable;
- bonds strongly to the tiles;
- resists high strength detergents;
- is flexible;
- is fast drying and hardening:
- can be used for floor and wall covering of various sizes.

All of the materials installed in the Mülheim/Ruhr Metro stations were grouted with ULTRACOLOR because it meets all of the above requirements (Photos 7 and 8).

PHOTO 1

PHOTO 2

PHOTO 3

PHOTO 6

PHOTO 4

PHOTO 5

Colorful vaulted ceilings

Plaster is an essential design ingredient in the vaulted ceilings used in Metro systems, especially in the Mülheim/Ruhr Metro where plaster was used in some places as a finish and in others in combination with soundproofing systems.

A waterproofing membrane and a flexible waterproofing paint were used to solve the usual problem of bonding the rigid plaster and combating its natural tendency to soil quickly (plaster often has a rough surface that traps dirt). After removing the traces of cement laitance and loose particles by sandblasting, the surfaces were treated with MAPELASTIC*. This product's easy pumpability enabled it to be pumped through 25 mm hoses and applied even over curved surfaces (Photo 9).

MAPELASTIC:
- is waterproof;
- bonds very strongly to the substrate;
- has extended open time;
- can be sprayed on, even when pumped over long distances;

PHOTO 7

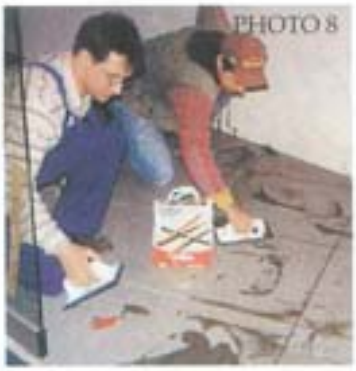


PHOTO 8

PHOTO 9

PHOTO 10

- can bridge cracks up to 1 mm wide;
- is fiber-reinforced.

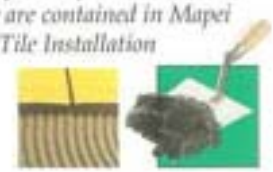
ELASTOCOLOR* was used to paint the stations' vaulted ceilings. ELASTOCOLOR is a flexible protective and decorative acrylic resin-based water-dispersion paint.

When completely dry, ELASTOCOLOR forms a flexible waterproof covering that is resistant to atmospheric agents yet is permeable to water vapor. ELASTOCOLOR has excellent resistance to aging, frost, and deicing salts and makes surfaces very resistant to dirt.

For the beautiful finished installation, see Photo 10.

Andreas Poitz is a consultant with the Mapei GmbH (Germany) Technical Service Department

The technical data sheets for the products mentioned in this article are contained in Mapei binders No. 1 "Ceramic Tile Installation Products" and No.3, "Building Specialty Line"



TECHNICAL DATA

Project: Broich and Stadtmitte Metro stations in Mülheim/Ruhr, Germany.

Year built: 1997-1998

Project design and management: U-Bahnhof Tiefbau Ruhr, Germany

General Contractor: Heddenhausen GmbH Dienslaken

Materials: Granito Branco Perola, Rosa Forte and Bianco Cristal, AWS 5x24 cm glazed ceramic tiles, 11.5x24 and 24x24 cm Buchtal clinker.

Mapei products*
- **for the granite installations:**
PLANICRETE, GRANIRAPID, ULTRACOLOR
- **for the glazed ceramic tiles:**
PLANICRETE, NIVOPLAN, PRIMER G, ADESILEX P9, ULTRACOLOR
- **for the clinker:**
PLANICRETE, KERAFLEX, ULTRACOLOR
- **for the vaulted ceilings:**
MAPELASTIC, ELASTOCOLOR

*The products mentioned in this article are manufactured by Mapei in Europe.

The three

The Three Crowns office building in Augsburg, Germany gets an impressive new look after a complete remodeling.

by Walter Mauer

The Three Crowns Building was erected on the Banhofstrasse in the heart of Augsburg, Germany, on the site of the Three Crowns Hotel that was destroyed by bombing in the Second World War. The Bahnhofstrasse was developed at the end of the nineteenth century and featured commercial buildings four and five stories tall built in the typical style of the German industrial revolution, most of which were destroyed along with the hotel. In the 1970's with the agreement of local zoning authorities it was decided to remodel the exterior so it would harmonize with the architectural fabric of the remaining undamaged buildings on the street. Among the many designs considered, the one chosen was cladding the facade in precast foamed concrete. The external surfaces were sandblasted, then covered with the concrete panels. Regulations in effect at the time called for panels 20 cm thick, but 40-cm thick panels were used to prevent the concrete from decaying due to corrosion of the metal reinforcing.

Air pollution and concrete

At the end of the 1980's it became obvious that the measures taken to protect the concrete had been ineffective. The damage caused by vehicle traffic and industrial pollution, acid rain, fumes from automobile exhaust and heating fuel, and the carbon dioxide naturally present in the atmosphere caused severe surface decay and penetrated the concrete. Freeze-thaw cycles and rusting of the rebars caused by carbonation had caused come sections of the concrete to crack and others to come loose. The carbonation of the material, favored by its extreme hygroscopicity, caused the worst damage. Carbon dioxide attacks concrete and reacts with the calcium hydroxide

The Three Crowns Building in Augsburg, Germany after its remodeling

At left and on opposite page, details of the facade with its eye - catching porcelain tile cladding

released during the hydration of cement to form calcium carbonate. This chemical reaction in turn brings about a decrease in alkalinity. When the pH went lower than 9.5 the rebars were no longer protected from rust. They were corroded by moisture and oxygen, and the rust, which increased the volume of the rebars, caused the concrete covering to detach.

Initially cold-rolled sheet aluminum cladding coated with baking paint was considered, as was covering the facade with a colored, corrosion-resistant acrylic resin-based dispersion system, but both ideas were discarded.

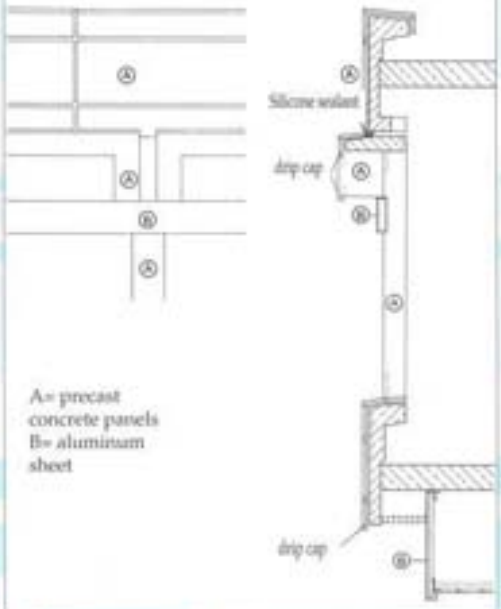
Porcelain tile cladding

The architect engaged by the building's owners studied every possible solution that would enable the facade to be restored without having to use metal cladding. The material had to be waterproof and highly resistant to air pollution, freeze-thaw cycles and variations in humidity. The architect chose ceramic tile which met all of the criteria, since tile:

- has high mechanical strength;
- has a very hard surface with a high resistance to abrasion;
- absorbs very little water;
- is highly resistant to aggressive chemical agents;
- is highly fire-resistant;
- is color-fast.

A trial application was carried out using AP 756 30x30 cm/12"x12" porcelain stoneware tiles by Flaviker. Adhesives and grout were selected that could resist the considerable stresses that are generated in cladding. For this reason a highly flexible adhesive was used. Naturally the materials had to comply with current German standards, especially with DIN 18156 which specifies that materials must be supplied by a firm with ISO 9001 certification and be installed by a qualified specialized contractor. Mapei products met these conditions perfectly. The tile cladding was installed by Rauten Strauch und Hartman of Augsburg.

DETAIL OF THE FAÇADE



After the underlying masonry was properly prepared, repair work was started on the damaged concrete, following methods outlined in DIN standard 18349, specification VOP, section C. The concrete was repaired with special cementitious mortars. The tile was then applied on a surface measuring about 2,100 square meters (22,600 sq ft) using methods prescribed in DIN standard 18157, section 1, as called for in the design and the installation criteria for external cladding in DIN 18515, section 1, of April 1993.

KERABOND® was used to bond the cladding. This product is a powdered ceramic tile adhesive that complies with DIN 18156, section 2, modified with ISOLASTIC®, an elasticising latex for cementitious adhesives. This adhesive is highly flexible and reduces the stresses caused by thermal expansion between the ceramic cladding and the concrete substrate. The adhesive was applied to both tiles and the substrate using the backbutter and float method. This eliminates voids on the substrate, preventing water from seeping in under the tiles, causing them to come loose when ice forms.

Colored grout

ULTRACOLOR® grout was used for

the 5 mm-wide joints. ULTRACOLOR is a fast-setting, fast-hardening cementitious grout that is flexible and water-resistant. A customized shade of ULTRACOLOR was used to give the facade a uniform color, as requested by the city planning commission. The expansion joints on the facade and the aluminum profiles of the windows were sealed with a one-component polyurethane sealant. Using ceramic tile installed with hi-tech materials and systems satisfied the architect's requirements and dispelled all the doubts initially expressed by the city zoning and planning commissions about the size of the tiles used. The long custom-colored vertical and horizontal grout lines make the parapets stand out in bold relief, yet pull all the elements together into a harmonious overall look that is now much admired by all concerned.

Walter Maurer is an engineer who studied at the building department of the Faculty of Civil Engineering at the University of Essen, Germany. Formerly director for Northern Germany of the Technical Applications division of a chemical company, since 1996 he has been the Technical Service Manager of Mapei GmbH in Erlenbach, Germany.

TECHNICAL DATA

Project: Three Crowns Building, Augsburg, Germany

Built: 1970-72

Remodeled: 1997

Architects: Studio Brendle und Partner BDA, Augsburg, Germany

Cladding contractor: Rauten Strauch und Hartmann, Augsburg, Germany

Cladding: 30x30 cm porcelain tiles by Flaviker, Italy

Mapei products used:*
KERABOND + ISOLASTIC
ULTRACOLOR

*The Mapei products mentioned in this article are manufactured in Europe.

The technical data sheets for the products mentioned in this article are contained in Mapei binder No. 1, "Ceramic Tile Installation Products"

ESTAÇÃO DO ORIENTE

In Lisbon's East Station, one of the world's most beautiful examples of contemporary architecture, Mapei solutions were used to meet the technological challenges of Santiago Calatrava Vall's "big machine".

by Natasha Calandrino

The Estação do Oriente, or East Station, project was one of a series of public works designed for Lisbon in conjunction with the International Exposition of 1998. Building this transportation hub was an opportunity to address several concerns simultaneously: the construction of this grand infrastructure project would enable the city to absorb the flow of Expo visitors and at the same time regain access to the Tagus River that had long been blocked off by the railroad.

Santiago Calatrava Valls, the architect of the station complex, needs no introduction. Having a doctorate in civil engineering and another in architecture has given the architect a dual perspective that enables him to combine shapes and materials in a unique way. The Estação do Oriente won the 1998 Brunel Madrid award over 98 other designs from all over the world for projects completed between 1 January 1992 and 31 May 1998. The award is given for the best architectural, engineering or railway construction project, or for a work that contributes to improvement in the quality of railroad design.

Simple lines

The Estação do Oriente opened on 19 May 1998. It is Portugal's most important transportation hub and one of Europe's biggest, with a surface area of 150,000 square meters (1,600,000 sq ft). The station efficiently handles several modes of transportation, connecting the railway with the Metro system and the bus terminal, and even contains airport check-in facilities, besides providing direct access to the docks on the river. The complex contains private parking for 2,000 automobiles. The organizing element of the project is a bridge 19 meters above ground level that supports eight railroad tracks (see drawing no.1 on page 24). The station's most unique feature is its roof, a metal structure shaped like sixty stylized trees (drawing no. 2). The shape was inspired by such traditional symbols of Lisbon city life as the arches of the Aguas Lívres aqueduct and the trees on the hills of São Pedro de Alcântara park.

The interior of this monumental structure resembles a cathedral where sunlight filters through a series of porticoes in a play of light and shadow. Passengers come and go in a supremely functional yet practical, spacious and airy environment. Architecturally this grand public space forms a very simple figurative whole whose individual elements stand out in bold relief,

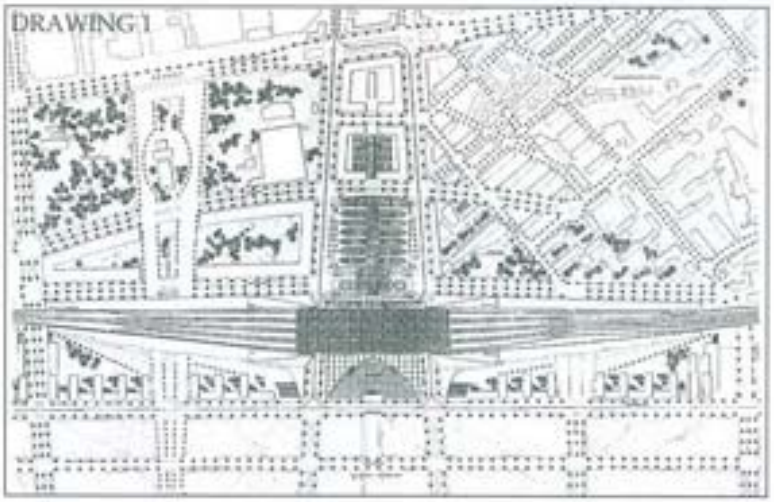
PHOTO 1

featuring architectural concrete, glass brick panels, Portuguese patterned flooring, metal roofing, and glass elevators.

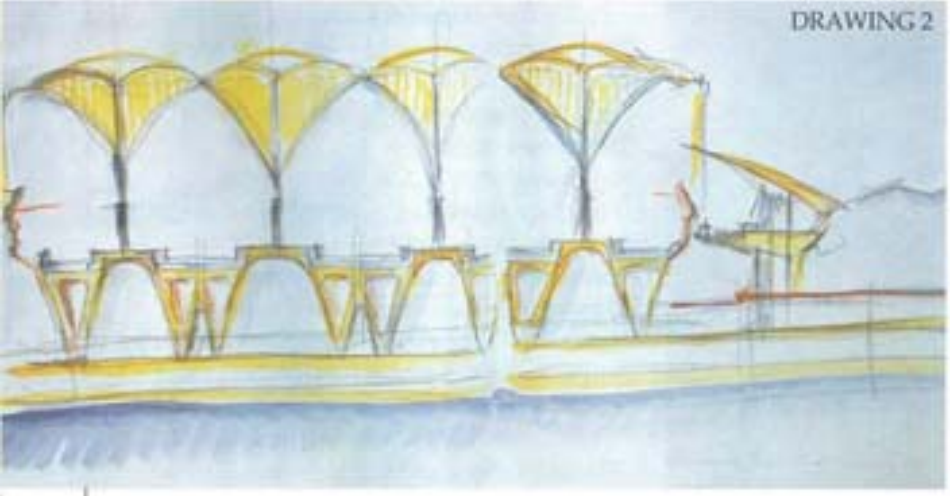
Complex technology

Several factors affected the construction timetable for the station (Photo 1):
- **the deadline:** the opening of the station was planned to coincide with that of the Lisbon Expo on 22 May 1998;
- **railway traffic:** the Northern line of the railroad had to remain open for the entire period of construction;
- **craftsmanship:** the design was a unique combination of craftsmanship and modern technology, and as such was very labor-intensive;
- **risk of earthquake:** the area is at high risk seismically;
- **difficult access:** various other projects adjoining the station were under construction at the same time;
- **demolition and rebuilding of underground infrastructures:** the city's main water tunnel and its largest sewage line are underneath the station. These required construction of large tunnels deep underground.

DRAWING 1



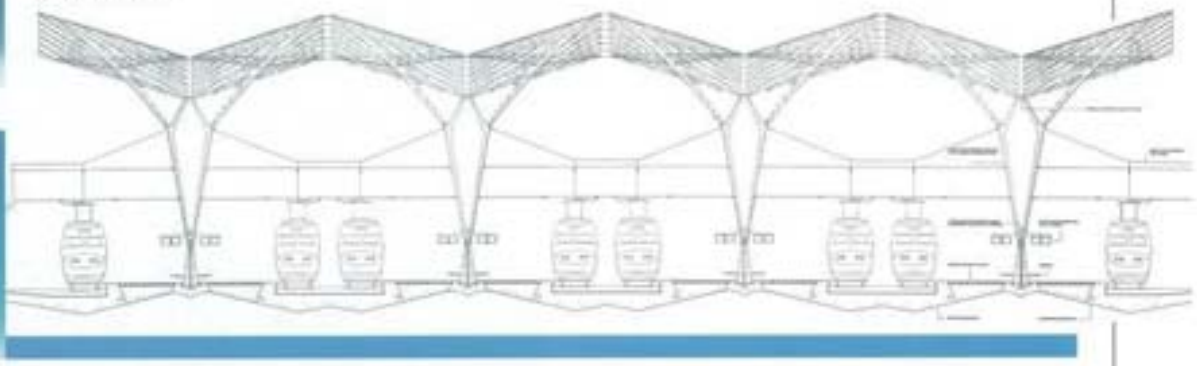
DRAWING 2



The bridge

The eight railroad tracks cross the area over a bridge covered by a modular metal structure 238 m (764 ft.) long, 68 m (218 ft) wide, and 28 m (89 ft) high that supports a glass roof (drawing no. 3). This metal structure forms a canopy that resembles 60 stylized trees and is made of cement, steel and glass. The steel supporting columns are embedded in concrete bases (Photo 2) and were first treated with MAPEFER*, a cementitious corrosion-resistant mortar for steel reinforcement used to protect metal surfaces from rust.

DRAWING 3



MAPEGROUT THIXOTROPIC* was applied where the tapering steel columns were embedded in the concrete. This product is a fibrous mortar with controlled shrinkage for the repair of concrete. MAPEGROUT THIXOTROPIC mixed with water forms a mortar whose thixotropic consistency enables it to be applied on vertical surfaces without formwork and without sagging, providing significant savings in time and money (Photo 3).

The train platforms feature glass concrete floors bordered by precast white cement blocks.

These, too, were treated with MAPEGROUT THIXOTROPIC, used in this case to even out surface imperfections in the concrete. MAPEFINISH*, a two-component cementitious finishing mortar for concrete was used in a white-colored version specially formulated for this installation to make the glass concrete floor and the cement blocks the same shade of white (Photo 4). After they were finished, the precast blocks were set with KERABOND+ISOLASTIC*, a cementitious adhesive system with high bond strength and flexibility, and excellent waterproofing properties. The precast white concrete panels that make up the

PHOTO 2

PHOTO 3

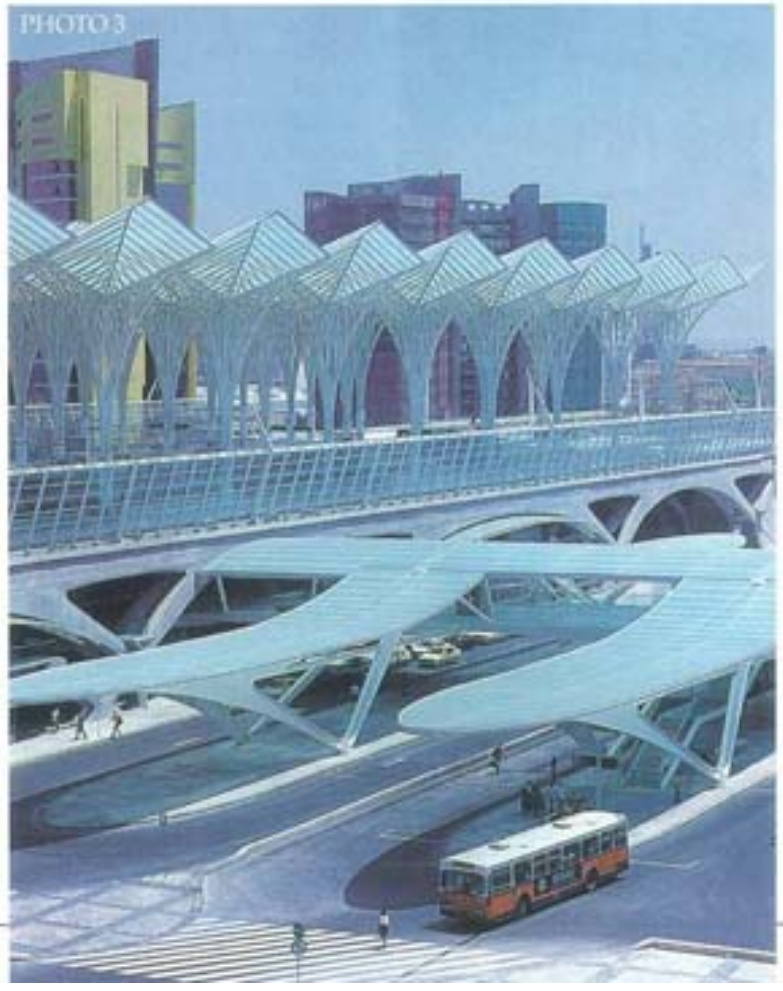


PHOTO 4

glass cement floors were joined with white KERAPOXY*, a two-component epoxy sealant with exceptional bond strength and mechanical and chemical resistance that hardens without shrinkage in a few hours (Photo 5).

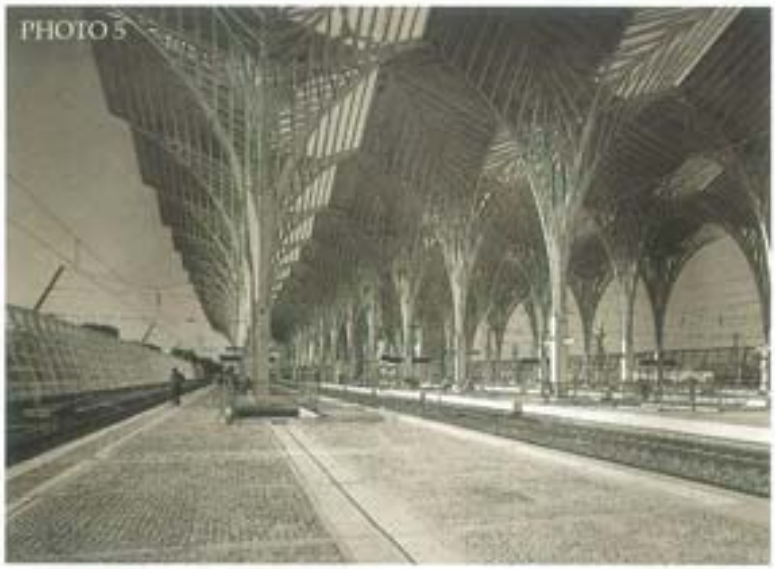


PHOTO 5

Access to connections

The center section of the station complex is built on several levels. Access to the railroad station and the metro system is fourteen meters above ground level. A glass-enclosed walkway with panoramic elevators leads down to the bus terminal and parking lots. Nine meters above ground level the atrium and retail areas are arranged around a bare space from which escalators descend to the ground-level plaza facing the river docks.

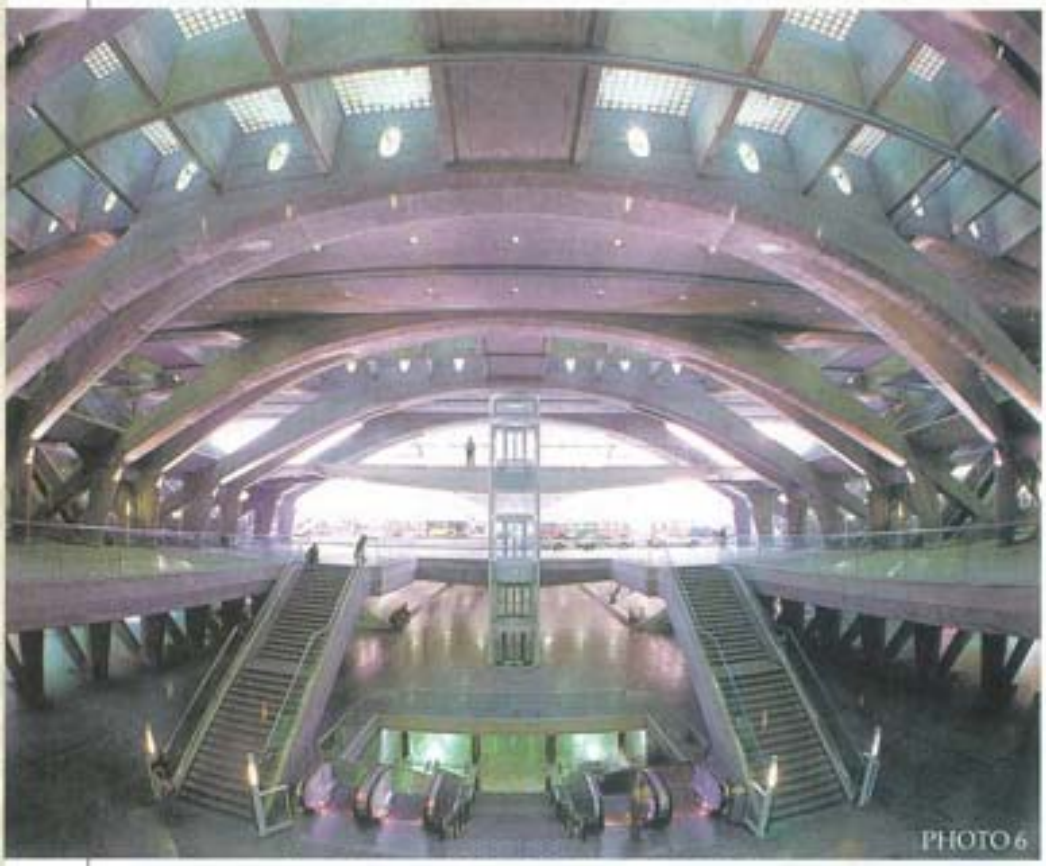


PHOTO 6

All the floors in the center section were covered with grey granite installed over screeds modified with PLANICRETE*, a synthetic rubber latex for cementitious mixes that improves flexibility, bonding and workability. The granite floor was grouted with ULTRACOLOR*, a fast-setting, fast-hardening cementitious grout that, unlike conventional grouts, forms no surface efflorescence (Photos 6 and 7). It took almost three years to complete the bearing skeleton of the station, during which time concrete was being poured non-stop. Because the roof was not yet built, the concrete had to be protected from atmospheric agents, especially rain, with ANTIPLUVIOL S*, a siloxane resin-based, colorless water-repellant protective compound. ANTIPLUVIOL S is a transparent liquid that penetrates deeply and reacts with the natural moisture present in the concrete to form a water-repellant coating inside the pores and capillaries. Because of its special formula, ANTIPLUVIOL S does not create a film and as a result it remains permeabile to water vapor, while providing exceptional resistance to alkalinity and ultra-violet rays (Photo 8).

PHOTO 7

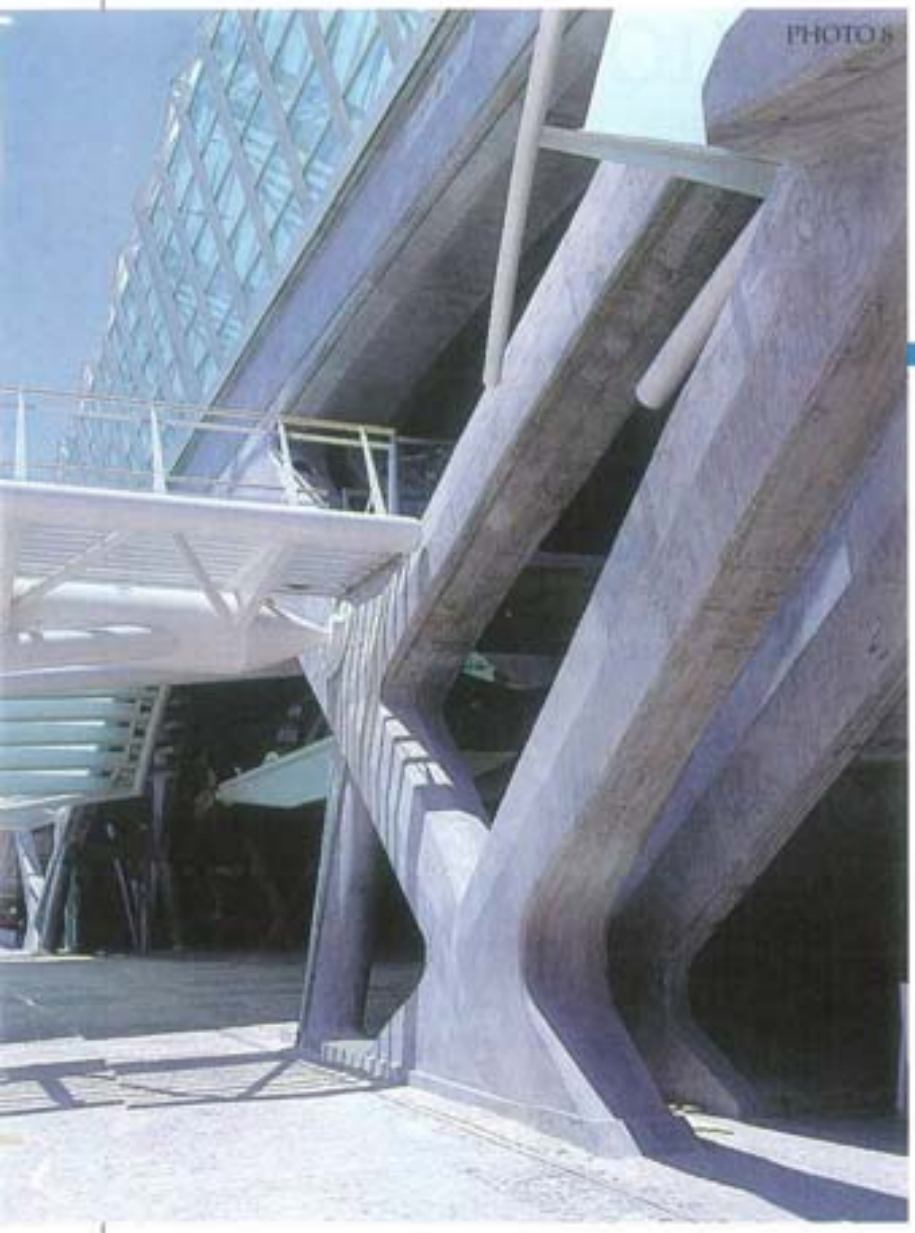


PHOTO 8

Precision machines

The highly technical content of Santiago Calatrava Vall's buildings (Photo 9) have made his work famous.

They have been described as enormous machines in which function plays the prime role. Yet his highly plastic and expressive design solutions are the product of an artistic quest for form that results in a bold style of architecture with a high visual impact on the surrounding landscape. The Catalan architect's exploration of form and space finds expression even in highly complex projects such as the Estação do Oriente that would be impossible without the help of the most advanced building technology.

The Technical Data Sheets for the products mentioned in this article are contained in Mapei Binder No. 1, "Ceramic Tile Installation Products" and No. 3, "Building Specialty Line".

PHOTO 9

TECHNICAL DATA

Project: Estação do Oriente, Lisbon, Portugal.

Built: 1995-8

Architect: Santiago Calatrava Valls

Project Managers: Calatrava Valls, S.A./Tecnep Lda/Sofrerail

General Contractor: ACE (Agrupamento Complementar de Empresas): Edifer – Soconstroi – Bpc – Somague – Necso

Mapei products*:

• for canopy over platforms:
MAPEFER
MAPEGROUT THIXOTROPIC
MAPEFINISH

• for precast blocks:
MAPEGROUT THIXOTROPIC
MAPEFINISH
KERABOND+ISOLASTIC

• sealant for concrete panels:
KERAPOXY

• granite floor installation:
PLANICRETE
ULTRACOLOR

• waterproofing for concrete:
ANTIPLUVIOL S

Mapei coordinator: Jean-Pierre Toussier

*The products mentioned in this article are manufactured by Mapei in Europe.

ADHESIVES WITH VERY LOW EMISSIONS OF VOLATILE ORGANIC COMPOUNDS

by Roberto Leoni

Since the 1960's the use of organic chemical products in construction has increased steadily. Uses have been found for these products both IN cement (Fig. 1) and other construction materials to enhance performance and workability, and ON cement (Fig. 2), in the form of sealants, waterproofers, protective paints, adhesives and consolidating compounds.

The chemical substances most often used include, primarily, various types of polymers and copolymers (polyacrylates, polyvinyl esters, polystyrene-butadiene, polyurethane, epoxy, silicon, polychloroprene, etc.) (Fig. 3) and also low molecular weight substances, such as solvents and biocides.

The biggest problem connected with using these products is their potential for emitting volatile organic compounds that can contribute, sometimes significantly, to indoor air pollution. Experiments performed in research laboratories and in the field have shown that even small amounts of chemical products with moderate to high volatility can generate substantial emissions that can linger for months at measurable levels in the air in interiors, depending on the conditions in which they were applied and the ventilation in the area (Fig. 4). The detriment to the user's health and comfort naturally depends on the toxicological and organoleptic properties of each substance, but the risk is generally rather low.

Nevertheless, some members of our industry who are committed to protecting the environment and improving the quality of life have started to develop new products that are safer to use, eliminating the more hazardous raw materials and reducing volatile substances to a minimum (Fig. 5).

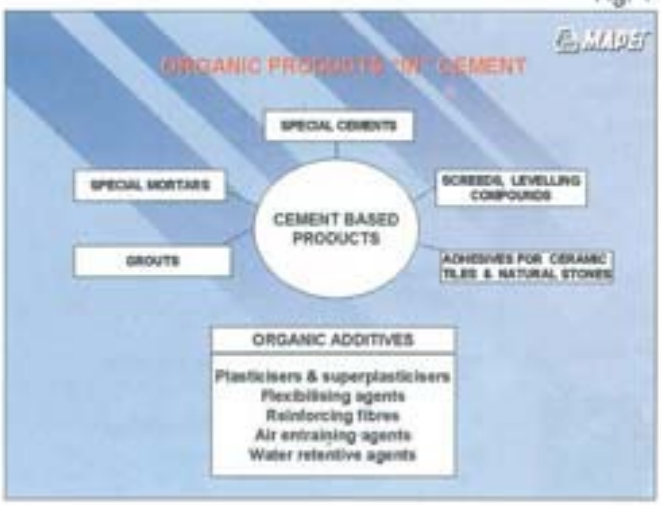
Mapei research

Mapei's commitment to protecting the environment led the company to modify its floor covering adhesives. The first major development was the formulation of polymer-based products in aqueous dispersion as an alternative to organic solvents. This made it possible to reduce drastically the total emissions of volatile organic compounds (VOC). These substances evaporate immediately after adhesives are applied and in the first few hours after flooring is installed (carpet, wood parquet, rubber, etc.). This was a great benefit for the health of professional installers, who were no longer exposed to harmful fumes, and also for the environment. Although this was a significant achievement, Mapei did not think it sufficient for the present needs of the Italian market, and even less so for the international market, both of which are increasingly sensitive to environmental and health issues.

Stimulated by market demand, by increasingly strict international standards and the self-regulatory codes of associations of adhesive and floor covering manufacturers, Mapei directed its research efforts in two different streams: the first, formulating solvent-free adhesives with very low potential emissions even in the long term (Fig. 6), and the second, designing analytical systems to monitor VOC emissions over time in the laboratory. These systems would both guide the research and enable various products on the market to be objectively evaluated.

Developing formulations for indoor applications required careful

Fig. 1



selection of ingredients with very low VOC emissions both in the short and the long term. The ingredients for the adhesives included:

- binders (usually polymers)
- initial tackifying agents (resinous products)
- regulators of viscosity
- plasticizers or, alternately, substances that add flexibility
- additives (wetting agents, dispersing agents, biocides)

This selection was made possible only with the close cooperation of those raw material manufacturers who were more sensitive to environmental concerns. Without going into details regarding confidential Mapei formulas, we can, however, describe the selection criteria. Mapei chose binders that were synthetic resins in aqueous dispersion with very low amounts of free monomers or volatile oligomers. These polymers are manufactured in Northern Europe and North America. Some are manufactured by Mapei itself. The polymers used could not contain known carcinogens, mutagens, or teratogens, nor could they remain free monomers in amounts larger than 0.1%. This choice was neither easy nor banal because at present few polymer dispersions on the market meet these conditions. The same thing could be said for the other macromolecular materials as well, such as the resinous tackifiers. Eliminating solvents as thinners to regulate viscosity and replacing them with water necessitated the inclusion of wetting agents or dispersing agents as additives to facilitate the compatibility of the various ingredients (water, mineral fillers, plasticizing oils, etc.) and also biocides as preservatives. Although present in small amounts, even these ingredients were chosen with the utmost care as to potential emissions, especially the biocides selected, which contain no substances that release formaldehyde or other volatile products over time.

As for plasticizers and substances that add flexibility, Mapei opted for oils or resins with high molecular weight and very low vapor pressure.

Monitoring methods

Developing these adhesives required the parallel development of methods for monitoring and analyzing the formulations' emissions over time. An

Fig. 2

Fig. 3

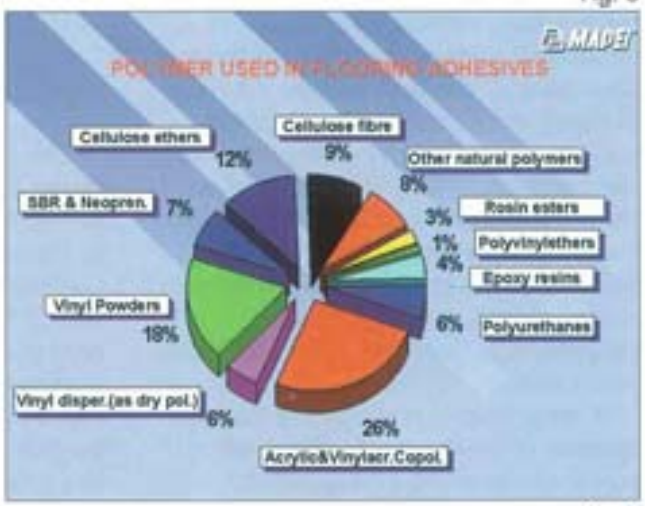
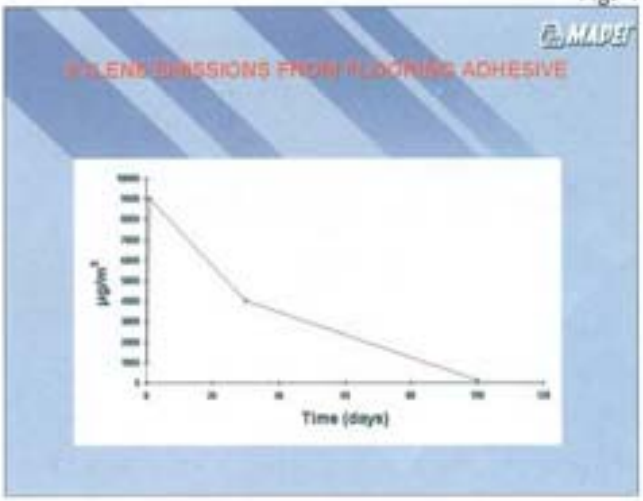


Fig. 4



"environmental test chamber" was built in the laboratory for the purpose with a volume of 350 liters. Adhesive is placed on glass plates that are inserted into the test chamber. The ratio of the surface measurement of the adhesive applied on the glass to the volume of the chamber ($0.4\ m^2/m^3$) simulates a situation that might exist in a room in a typical apartment. A stream of air is forced through the chamber which is purged of volatile organic compounds in four stages through a complicated filtration and purification system programmed to provide a total change of air every two hours. Leaving the chamber, the air passes through tubes that contain absorbent material. The volatile organic compounds collected are analyzed at established intervals by means of thermal desorption of the tubes and the injection of vapor into a chromatograph that is connected to a specially calibrated mass spectrograph. In the initial phase of our study the emissions were monitored for ten consecutive days. This caused long delays between tests and slowed the pace of the research, making it impossible to evaluate more than two or three formulas per month.

A more thorough analysis of the large quantity of ten-day test results made it possible to establish a bilogarithmic correlation of emissions/time. From this, an algorithm was calculated that could mathematically predict in close approximation residual emissions at 10 days based on 24-hour and 48-hour test data. This discovery enabled us to speed up the research work enormously and to develop our ULTRA/BOND ECO product line reasonably quickly. The test method is currently the subject of advanced CEN committee discussions regarding its becoming the official European standard for evaluating the potential emissions of adhesives after application.

Once the formulas of our low TVOC (Total Volatile Organic Content) product line were perfected, we had to make sure no contamination occurred during the production process. Production lines were reserved exclusively for these products to prevent pumps, valves and pipes used in "non-eco" processes from leaving traces of VOC that could alter the properties of the finished product. The environmental quality of the entire system of production at the Robbiano di Mediglia plant was reviewed and certified by CERTIECO as being in compliance with the ISO 14001 standard.

Certified products

This line of products was certified "low TVOC content" both by the American Carpet and Rug Institute (CRI) according to an EPA (U.S. Environmental Protection Agency) test method, and by the German TFI (Teppich Forschungsinstitut) according to the GuT method (Gemeinschaft umweltfreundlicher Tepichböden). The ULTRA/BOND ECO low TVOC product line has already been marketed in the USA and Canada, countries traditionally sensitive to environmental concerns. Sales have been more than satisfactory, which proves that developing products perceived by the public as being safer for people and the environment can also be a great commercial opportunity.

Fig. 5

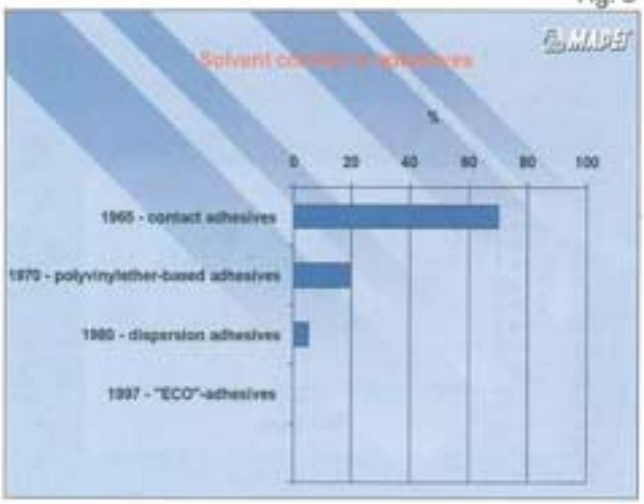
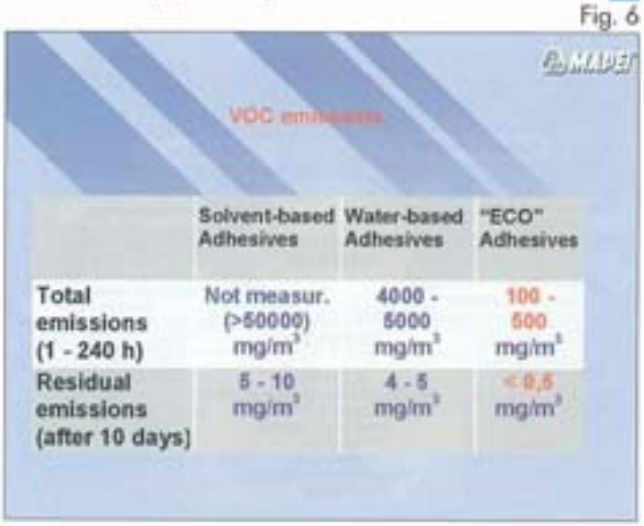


Fig. 6



ZERO-RISK ADHESIVES

Creating safe indoor environments is one of the most important research subjects currently being pursued by progressive, environmentally sensitive manufacturing companies. Mapei, one of the world's leading manufacturers of floor covering adhesives, pays special attention to environmental concerns. For some time now our research laboratories have used advanced technology to develop products that protect the health and safety of the people who use our products.

The use of organic chemical products can result in emissions of harmful volatile organic substances in interiors that constitute a potential health risk for users. Mapei's policy of protecting the environment and improving quality of life led it to develop a line of polymer-based products in aqueous dispersion as alternatives to organic solvents. These new products eliminate the risk of indoor pollution caused by certain floor covering adhesives. This breakthrough enabled emissions of volatile organic substances to be substantially reduced, both in the short (immediately after application) and long term.

To develop these adhesives, ingredients were selected that produce extremely low emissions of volatile organic substances. These include binders, initial tackifying agents (resinous products), regulators of viscosity, elasticizers or plasticizers, and additives used in place of conventional ingredients. At the same time an environmental test chamber with a volume of 350 liters was developed in our laboratory to monitor the emissions of various adhesives over time.

The research led to the development of the Ultra/Bond Eco product line of super-adhesives, adhesives, primers and smoothing compounds with low TVOC content (total volatile organic content). These products have minimal impact on the indoor environment and are not hazardous to users' health. The Ultra/Bond Eco line was developed under guaranteed contamination-free conditions in the Mapei plant in Robbiano di Mediglia (Milan), Italy. The Mediglia plant is certified by Certieco for its ISO 14001 Environmental Management System and has been entered on the EMAS (the European Union Eco Management and Audit Scheme) list of EU manufacturing facilities cited for environmental excellence. This is the EU's most coveted and prestigious environmental acknowledgement.

In February of 1999 Mapei's environmentally sensitive low TVOC content adhesives earned the Chemistry for the Environment (Inca) award for "Environmental Excellence" given in Venice by the Italian Consortium of Universities. The organization also awarded prizes to Lonza and Solvay, chemical companies that, like Mapei, belong to Federchimica, the Italian Federation of Chemical Manufacturers. All three are active participants in the "Responsible Care" program.

Mapei's environmentally sensitive low TVOC content adhesives include:

- Ultra/Bond Eco 185 solvent-free water-dispersion super-adhesive with low environmental impact;
- Ultra/Bond Eco 540 acrylic water-dispersion adhesive specifically formulated for linoleum;
- Ultra/Bond Eco 575 solvent-free high performance acrylic adhesive for baseboards and profiles in PVC, rubber, wood and carpet;
- Eco Prim R solvent-free, low TVOC neoprene water-dispersion adhesive for bonding to any substrate;
- Eco Plan solvent-free, low TVOC, ultra-fast hardening self-leveling smoothing compound for thicknesses of 1-10 mm;
- Ultra/Bond Eco V4 SP universal acrylic adhesive with extended open time for rubber, PVC, vinyl, and polyolefin floor coverings, lineoleum and carpet.

ECOLOGY FIRST

Marketed first in North America and now available in Europe, the Ultra/Bond Eco line was developed through the joint efforts of researchers in Canada, Italy, and the USA, with the help of the environmental test chamber they perfected to measure emissions of volatile organic compounds.

Research has always been one of Mapei's strong points, even when the company was still small and the lab had only one full-time employee. Mapei S.p.A. President Giorgio Squinzi, then a high school student, worked in the laboratory with his father, Mapei founder Rodolfo Squinzi. Research is still one of Mapei's strong points, today more than ever, when Mapei has become a multinational company and the world's leading adhesives manufacturer. Mapei's avantgarde research absorbs 5% of its annual turnover and employs 170 researchers concentrated for the most part in four research centers on both sides of the Atlantic.

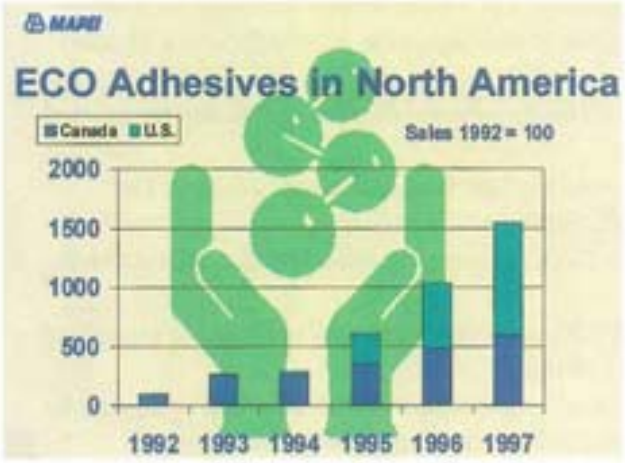
Mapei's experience is not merely theoretical but is the accumulated result of practical testing daily in the laboratory and on job-sites. This experience reflects local market conditions and trends, and is channeled into the development of new products, like the Ultra/Bond Eco product line for resilient flooring. These products are non-toxic, user-friendly and safe for the environment. The Ultra/Bond Eco logo is a flower symbolizing Mapei's environmental commitment. The product line was first developed and marketed in North America, and was subsequently adapted for distribution in Europe in a process that involved the first large scale joint research effort by the Mapei Group. The line consists of thirteen products that are currently sold in North America, eight in Germany and six in Italy (where the market is, for the moment, less sensitive to environmental issues).

In the beginning of the 1990's the research laboratory in Laval (Montreal), Canada made its first study of products with very low emissions of volatile organic substances. A team of five researchers worked under the direction of two Canadians, André Drapeau, Director of Research, and Bruno Boulanger, who was named Mapei's Director of Product Management for the Floor Covering Installation Products Division after years of experience in lab research himself. The project was initiated because it became increasingly difficult to sell adhesives that contain solvents in North America, a market where 90% of the flooring installed in homes and offices consists of resilient materials: carpet, PVC, and linoleum.

The "ban" on conventional adhesives that contain solvents

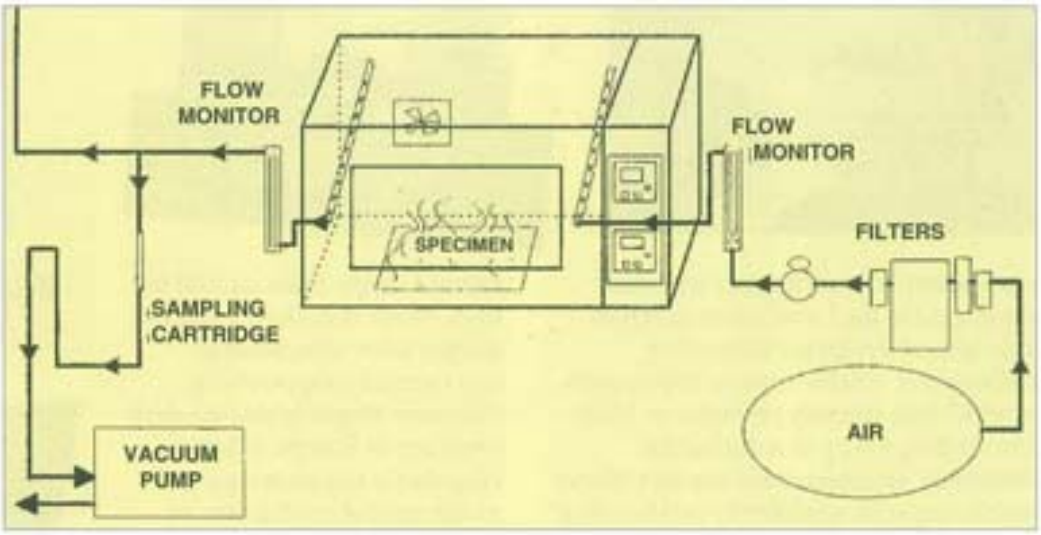
Laws drafted to curb pollution in states like California and Washington, together with the self-regulation adopted by carpet, PVC and other resilient flooring manufacturers, resulted in a virtual ban on conventional adhesives

ECO adhesive sales in North America increased dramatically over a seven year period, making Mapei the market leader.



From left to right, Bruno Boulanger, José Pedra, Cesare Mesani, and Giuseppe Facchetti

Below, the environmental test chamber in the Milan lab. On the right, a diagram of how it works.



containing solvents. These products were initially replaced by synthetic latex-based adhesives in aqueous dispersion with a low solvent content of approximately 5% that was needed to regulate certain characteristics such as setting time and film formation. Solvents were still present, albeit in lesser amounts. This was a problem, especially in the United States, where the public demands "cleaner" chemical products. For this reason the American Carpet and Rug Institute pressured adhesive manufacturers to develop products that were virtually solvent-free. Mapei took up the challenge. It put a team to work at the Laval research center and at the same time collaborated with the U.S. Environmental Protection Agency to sit on the commission charged with fixing minimum requirements for products with low emissions of volatile organic substances.

Adhesives need two characteristics to be effective: (1), good adhesion, and (2), easy application, especially because they are manually applied with a trowel. The challenge that the Canadian team faced involved finding a substitute for solvents, which evaporate quickly and enable adhesives to bond as quickly. The turning point, or quantum leap, came in 1993 when Peruvian-American José Pedra joined the research team. Pedra, in his fifties, headed the carpet and resilient products laboratory in the Mapei Corp headquarters in Garland (Dallas), Texas. With his help the team succeeded in replacing the solvents with special resins and latexes that release no volatile substances, yet are extremely workable and highly adhesive.

The result was the first product of the Eco line, Ultra/Bond 185 for textile floor and wall coverings, soon followed by Eco 540 (for linoleum) and Eco 575 (cove base adhesive for PVC, rubber, wood and carpet), and the other Eco products. The

Eco line leaflets in various languages.

environmental test chamber was also developed in the Laval research center. This special device for measuring emissions of volatile organic compounds, or VOC, was recently perfected in Milan. Discovering a way of reducing the adhesives' environmental impact without interfering with workability and bonding resulted in skyrocketing North American sales for the Eco line of carpet and resilient adhesives in the last seven years. Mapei shot to the top of the market, going from tenth to second place, and may make it to first place by the end of this year.

The transfer of this technology from North America to Europe began when Giuseppe Facchetti, a young researcher with a doctorate in industrial chemistry, was sent across the Atlantic to spend a year in Dallas and Montreal before returning to Milan. Back at the original Mapei research center on Milan's Via Cafiero, the Eco line was reconstructed by Cesare Misani, the 40 year old head of the organic adhesives department who has been with Mapei since 1986. Ultra/Bond Eco 185, 540, 575 and the other Eco products were ready to be marketed in Europe.

The Eco line makes its European debut in Germany

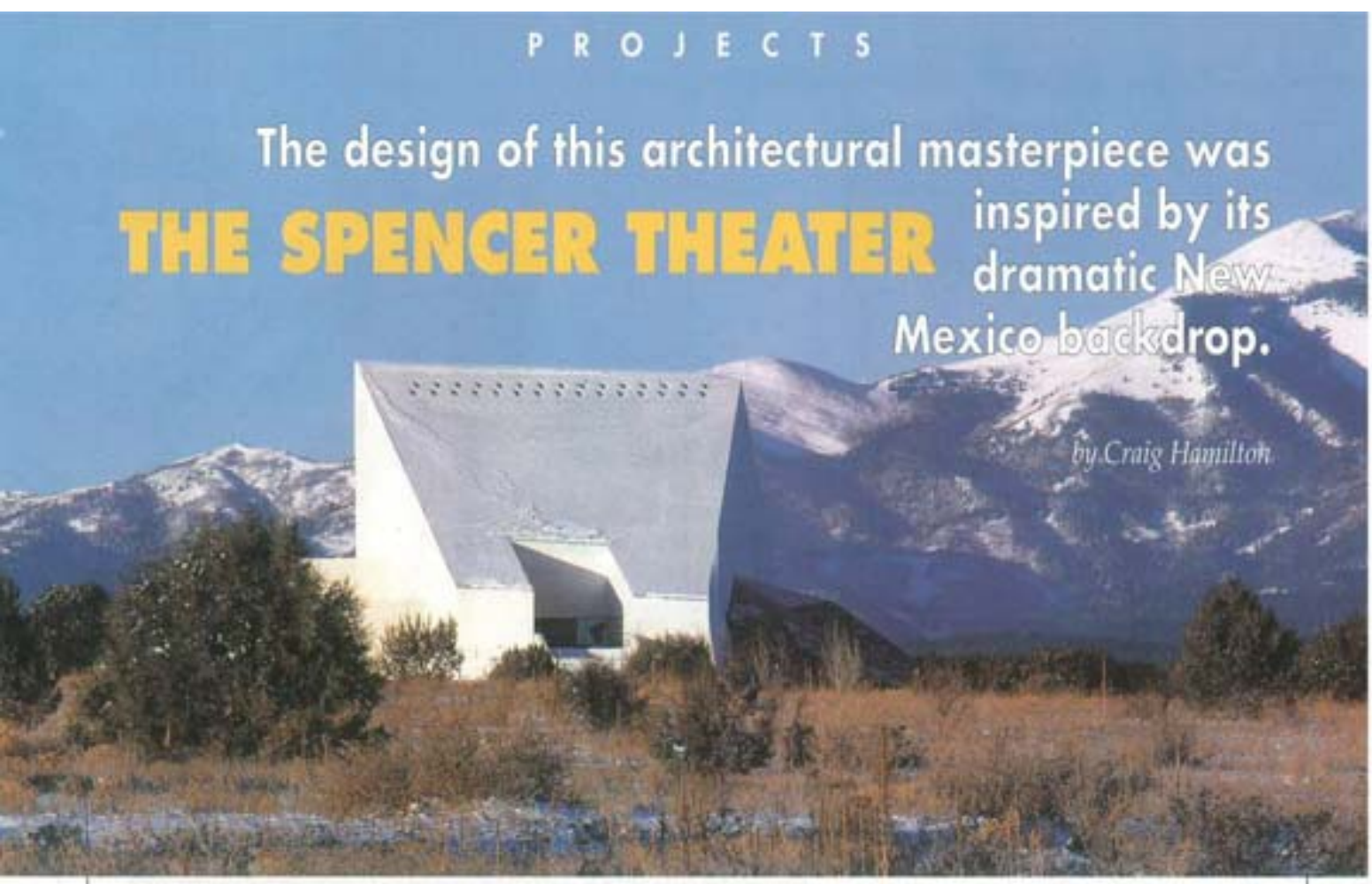
Germany was the first European country to market the Eco product line because resilient and textile coverings are used in most of its homes and offices, as in North America. Austria and Belgium were the next countries to distribute the line, which has now been extended to the rest of Europe. Sales are still far from North American levels but market share is increasing exponentially, especially in Germany. Mapei is also the first company in Europe to submit voluntarily to year-round monitoring of production by the TFI of Aachen, the German research institute for textile flooring. Unlike those of the competition, Mapei products are constantly tested according to the TFI's German standards to certify that the contents correspond to the description on the label. Since the first of January, 1999, a smaller version of the Eco product line is also being marketed in Italy (six products in all, almost half of the number of Eco products sold in the United States). Sales have been promising, even though the demand for environmentally sensitive products is lower in Italy than elsewhere in Europe.

The team effort was a valuable learning experience for all concerned: Mapei researchers believed they could achieve their goal, committed themselves to making a better product, and succeeded in developing a product line that outperforms the conventional materials it replaced. The team approach achieved brilliant results: better, safer products that increased sales and market share. When faced with the challenges of the new millennium, companies in the lead are continually called upon to renew their leadership.

THE SPENCER THEATER

The design of this architectural masterpiece was inspired by its dramatic New Mexico backdrop.

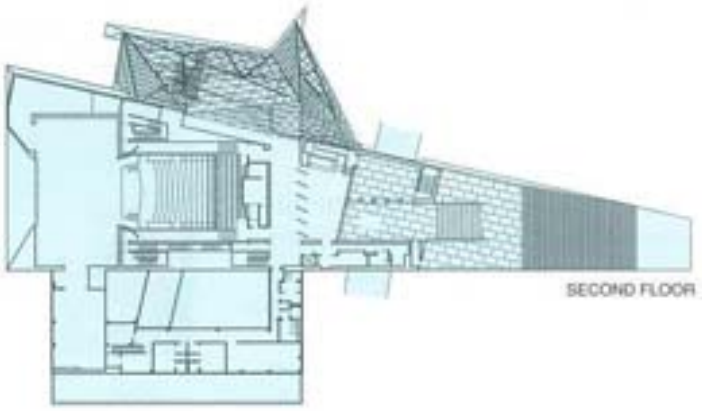
by Craig Hamilton



Gleaming white in the distance like the temple of an unknown civilization, a building stands out in bold relief on the flat, windswept mesa in the high desert of southeastern New Mexico. It's neither a mystery nor a mirage, however, but the very real fulfillment of a dream: the Spencer Theater for the Performing Arts.

It all started in 1948 when Mrs. Jackie Spencer moved to the little town of Alto, New Mexico after her marriage to A. N. Spencer, a prominent local cattle rancher. Many years later, while attending an outdoor concert in Boston, Massachussetts it occurred to Mrs. Spencer that her corner of the American Southwest would provide a magnificent setting for music. It took fifteen years and twenty million dollars for Mrs. Spencer to make her dream come true when the 514-seat theater finally opened in October, 1997.

Mrs. Spencer wanted to locate the theater in splendid isolation on the mesa near Alto. One day while she was scouting out the terrain with some friends, one of them came across a type of template once used for making violins. Half buried in the ground, it had probably been there for a hundred years. The discovery was interpreted as a sign. The theater was subsequently built on a 20-acre parcel of land on that very site,



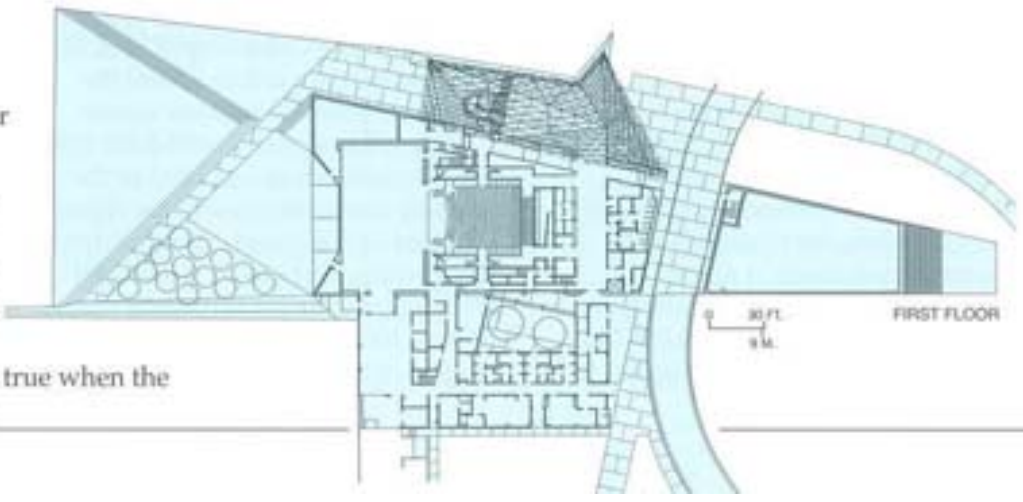


PHOTO 1

PHOTO 2

a few miles from the town of Ruidoso.

For renowned Albuquerque architect Antoine Predock, the telephone call from Mrs. Spencer seemed like a dream, too: a private client with large resources and above all, vision. Mrs. Spencer was clear about wanting an elegant building rather than the usual Southwestern adobe. Inspired by the view of the majestic Sierra Blanca on the horizon, the highest peak of the Sacramento Mountains, Predock designed a wedge-shaped building with a facade of bleached Spanish limestone, chosen because its high mica content makes it reflect the sunlight.

Mapei was there to provide critical solutions to the construction challenges of the unique architectural design. Over 60,000 square feet of cementitious backer units were mechanically fastened over steel studs to form the substrate veneer of the theater. MAPEI PRP-315* was then trowel applied over the entire veneer of the cementitious backer units to provide a waterproof substrate suitable for the harsh New Mexico climate. At an altitude of 7,200 feet above sea level, the theater would experience tremendous changes in dimension due to the influences of the climate. Thermal gain, due to scorching heat during the day and freezing temperatures at night, demanded a waterproofing material with superior capabilities. MAPEI PRP-315 was selected for several reasons. Its fiber reinforcement coupled with its elastomeric qualities ensured its ability to resist the movement dynamics that the installation would endure constantly on the mesa. Furthermore, its cementitious nature provided complete compatibility with the White Grani/Rapid KER 318* bonding mortar used to adhere the bleached Spanish limestone veneer.

PHOTO 3

Grani/Rapid mixed with KER 318 Flexible Admixture was used as the bonding mortar because of the rigors imposed by the climate. Temperatures in the morning could be as low as 45°F (7°C) and during the afternoon soar as high as 100°F (38°C)!

In spite of these demands, the superior

Photo 1
Cementitious backer panels are fastened over steel studs to form the substrate veneer of the theater.

Photo 2
White Grani/Rapid KER 318 bonding mortar was used to adhere the limestone slabs over MAPEI PRP-315 waterproofing (visible in the photo). MAPEI PRP-315's elastomeric qualities ensure its ability to resist the movement dynamics of the installation.

Photo 3
Detail of the bleached Spanish limestone being readied for installation.

Photo 4
The limestone facade brilliantly reflects the sunlight.

PHOTO 4

Jackie and A.N. Spencer, benefactors of the Spencer Theater

open time, hydration characteristics and workability of the Grani/Rapid System allowed the work to continue at a steady pace. KER 200, #00 White*, polymer modified, sanded cementitious grout was used to finish this beautiful installation.

The Spencer Theater required the vision and generosity of Mrs. Jackie Spencer, the artistic talent of Mr. Antoine Predock and the technical prowess of MAPEI to provide this wonderful gift to the people of New Mexico.

TECHNICAL DATA

Project: The Spencer Theater for the Performing Arts, Ruidoso, New Mexico, USA

Built: 1997

Architect: Antoine Predock

Stone: Bleached Spanish Limestone fabricated in Italy

Waterproofing: MAPEI PRP-315*

Bonding mortar: White Grani/Rapid mixed with KER 318*

Grout: KER 200 #00 White*

General Contractor: PCL Construction Services

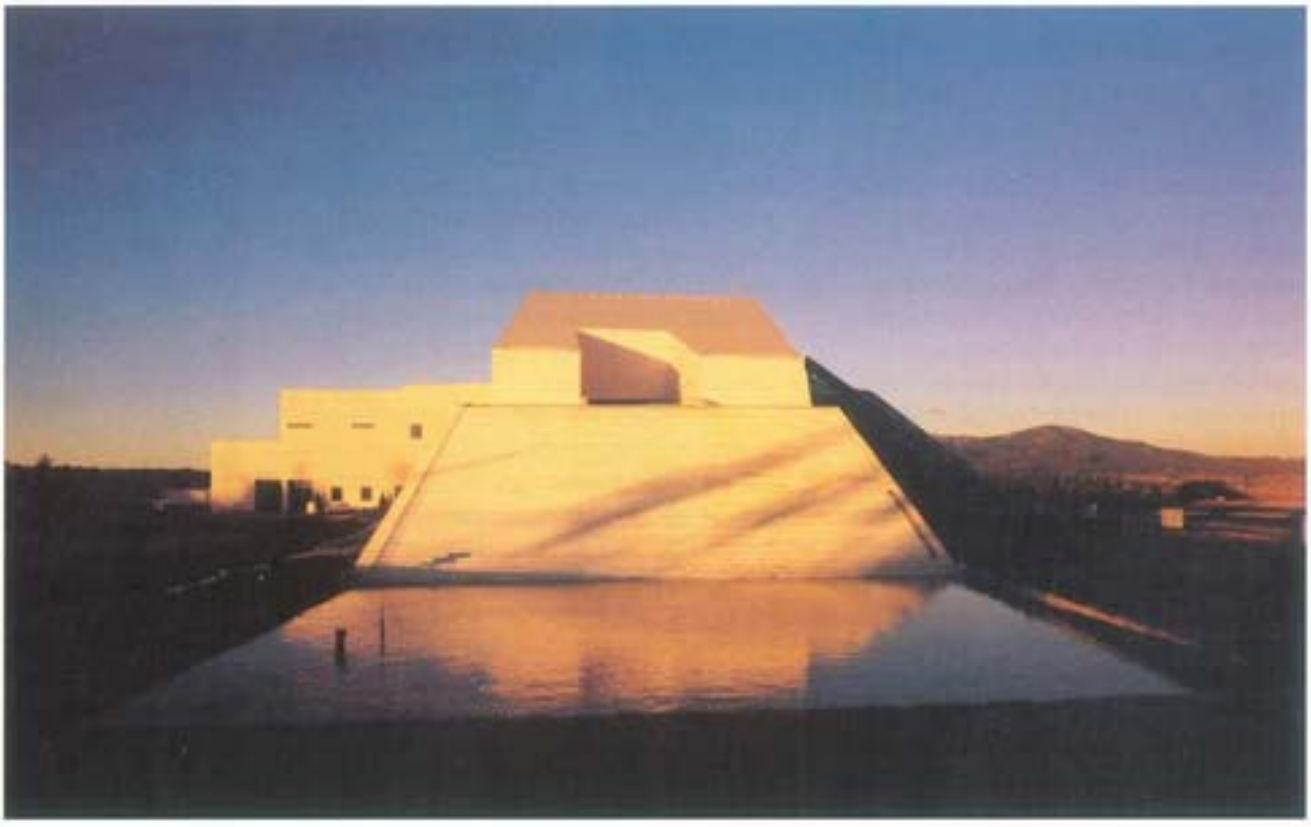
Tile Contractor: Artcraft Granite, Marble and Tile Company /Mr. Butch Woelfel

Tile Distributor: El Paso Tile and Stone

Mapei Coordinator: Bob Brown

*The products mentioned in this article are manufactured by Mapei Corp. (USA).

Craig Hamilton is Director of Technical Services and Regulatory Affairs, at Mapei Corp (USA).



A LABOR OF LOVE IN ETIOPIA

The efforts of a number of sponsors and a dedicated group of missionaries in southern Ethiopia made the new Dubbo Maternity Center possible.

The Second World War marked the end of Italy's short-lived overseas empire. Italy has since officially asked the pardon of its former colonies, Eritrea and Ethiopia. Despite the colonial past, ties remain strong between the countries and Italy remains Ethiopia's largest trading partner.

Helping hands

The so-called "civilizing mission" that was the subject of so much propaganda in the colonial era is actually being carried out today by the thousands of volunteers and missionaries who operate much needed schools and hospitals in Ethiopia. Among these are the Capuchin Missionaries who for over thirty years have been helping new mothers and their babies who are very much at risk in this part of the world. Infant mortality statistics here in the Horn of Africa are truly chilling: just consider the fact that when twins are born, one is left to die because there isn't enough food for both. This dramatic situation led to the opening of the Dubbo Maternity Center where a team of doctors and surgeons assists expectant mothers and newborns. The Maternity Center also coordinates ten medical clinics staffed by nursing sisters that provide basic health care and health education programs.

PHOTO 1

Italian firms donated the construction materials for this ambitious project including GranitiFiandre and Mapei, a gesture much appreciated by the Bishop of Soddo-Hosanna, Monsignor Domenico Marinozzi, who personally thanked the Center's sponsors.

Ancient meets modern civilization

This corner of the world was home to one of the world's oldest civilizations, the Kingdom of Axum, which flourished from the first to the tenth century AD before it gradually lost its dominance of the surrounding populations. Today cultural and economic conditions in the region are so backward that it requires continual assistance.

Construction materials and techniques used in Ethiopia are outdated and badly suited to the country's difficult climatic conditions. In this sense the technologically advanced materials donated for the Dubbo Maternity Center represented a major novelty for local workers who are always eager to learn new techniques. ADESILEX P9* was used to install 60x30 cm (24x12") and 60x40 cm (24x16") porcelain tiles donated by GranitiFiandre on the hospital walls and floors. ADESILEX P9 is an easy-to-apply

PHOTO 2

Under the watchful supervision of Enzo Ceccarelli, local tile installers learn to use new products, starting with mixing (Photo 1). The Ethiopians, shown here installing porcelain tiles on the walls (Photo 2) and floors in (Photo 3), were eager to learn new techniques. The tile installation was given a brisk scrubbing (Photo 5) before snapping the finished job (Photo 6).

cementitious powdered super-adhesive with highly adhesive and thixotropic properties. As a result it can be applied on vertical surfaces without running or sagging, even when installing heavy tiles as in this case.
After a brief demonstration on the job site of how to install the tiles, the young Ethiopian crew continued without

PHOTO 3

PHOTO 4

encountering any difficulties until the job was finished. The results were excellent: a job well done today that will serve as a symbol of cooperation and brotherhood for tomorrow.

PHOTO 6

PHOTO 5

The Technical Data Sheets for the products mentioned in this article are contained in Mapei binder no. 1, "Ceramic Tile Installation products".

TECHNICAL DATA

Maternity center – Dubbo, Ethiopia

Built: 1997-1999

Architect and Project Manager: Antonio Carnevale

Contractor: Antonio Carnevale S.p.A. – Addis Ababa, Ethiopia

Materials: 60x30 cm (24x12") and 60x40 cm (24x16") GranitiFiandre porcelain tiles

Mapei product used for installing the tiles: * ADESILEX P9

Training for crew: Adriatica Pittori e Restauri, Ancona, Italy

Mapei Coordinator: Gianmarco Felicetti

*The products mentioned in this article are manufactured by Mapei in Europe.

Anyone wishing to contribute to this humanitarian project may contact:
The Capuchin Foreign Missions
P.le Cappuccini, 1
62019 Recanati (MC) Italy
Tel. ++39/071/7570505 - Fax ++39/071/7577387

BUCAREST, BABES IN ARMS

Individual contributions and AVSI financed the remodeling of the pediatric pavilion for children with AIDS at the Victor Babes Hospital, in Bucharest, Rumania.

The remodeled pediatric pavilion for children with AIDS at the Victor Babes Hospital in Bucharest, Rumania, was inaugurated in January of 1996. The remodeling was an entirely Italian project in which quality products were donated for the best of purposes. The initiative was promoted by AVSI, the Association of Volunteers for International Service, that was initially to supply only medical equipment and furniture. Later on, thanks to the generosity of the agencies and individuals who sponsored the project, the pavilion was totally rehabilitated. The interior was gutted and reconfigured to be more functional, with new equipment, finishings and furniture designed for maximum comfort, safety, and resistance to wear. The basement floor contains the examining rooms and labs, the radiology and sterilization departments, the laundry and locker rooms. The ground floor contains hospital rooms with 15 beds, each room with its own bathroom, an intensive care unit with four beds, the head nurse's office, the doctor on duty's office and

service areas. On the first floor are located more hospital rooms with 26 beds, staff rooms, the dining room, a schoolroom and a playroom. On the top floor there is another playroom, and a physical rehabilitation room.

Hygiene

The most important concern to be addressed was hygiene, an essential requirement in any hospital for infectious diseases, but especially important in a facility for patients with immunological deficiencies. The rooms needed to have smooth easy-to-clean surfaces to prevent risk of infection. PVC was used for the interior floor and wall coverings.

The floors were first leveled with NIVORAPID*, a cementitious leveling compound that dries so fast that Mondo PVC could be installed over it only four to six hours later. The PVC was installed using ADESILEX V4*, a universal acrylic adhesive in aqueous dispersion. ADESILEX V4 need be applied only on the substrate and provides extremely high cohesion after only 48 hours. Mondo PVC sheet was also used as a wall covering installed with ADESILEX VS 45*. This product's excellent early grab while still wet and its highly thixotropic properties made for a perfect installation. The floors in the labs and offices were covered with ceramic tile installed with the Mapei products listed below in the Technical Data section.

The small brave Rumanian patients can count on a hygienic and comfortable environment while receiving treatment and, we hope, lots of tender loving care.

The Technical Data Sheets for the products mentioned in this article are available in Mapei binder No. 1, "Ceramic Tile Installation products", and No. 2, "Resilient Products Flooring".

TECHNICAL DATA

Project: Pediatric Pavilion, Victor Babes Hospital, Bucharest, Rumania

Remodeled: 1995-1996

Client: AVSI, the Association of Volunteers for International Service, Cesena (FO), Italy

Architect and Project Manager: Alberti Pezzi, Lugo (RA), Italy and Raimondo Gaindolla, Varese, Italy

Job site Manager: Fabrizio Pellicelli, Rome, Italy

Technical Manager, Victor Babes Hospital: Dana Covaci

Architectural consultant: Matei Likiardopol

Floor and wall covering consultant: Adriano Colombo, Varese, Italy

Floor and wall covering materials:
Mondo PVC
Cooperativa Ceramica d'Imola ceramic tiles

Mapei products for PVC installation:*
NIVORAPID, ADESILEX V4, ADESILEX VS45

Mapei products for ceramic tile installation:*
ULTRAPLAN, KERAFLEX, FUGOLASTIC, KERABOND, ULTRACOLOR, PRIMER S, MAPESIL AC, KERACOLOR.

*The products mentioned in this article are manufactured by Mapei in Europe.

Anyone wishing to contribute to this program may contact: AVSI, 47023 Cesena (FO), Italy, Tel ++39/0547/24054.

Concrete Cover

by Mario Collepardi

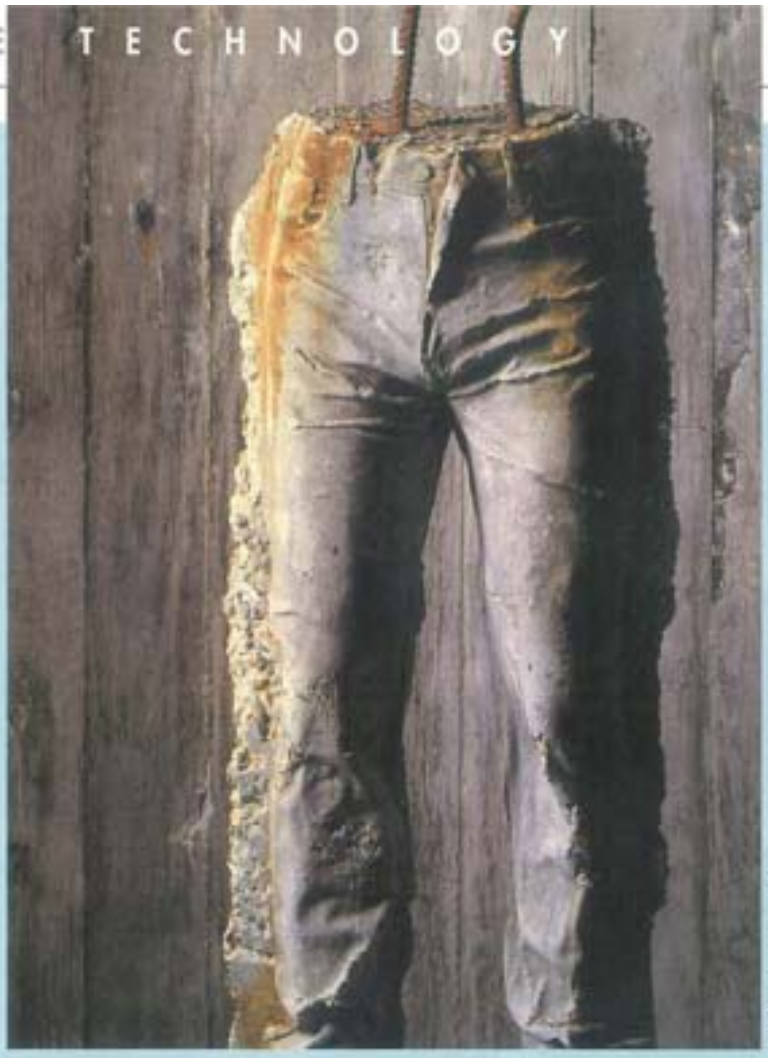
When designing a building, an architect is guided not only by general considerations that dictate size and shape, such as architectural style, function, static and dynamic stresses, the number and placement of the rebars, etc., but also by an especially important aspect that affects the structure's durability. This aspect is as important as it is neglected and it concerns the "skin" of the structure, i.e. its concrete cover.

In most reinforced concrete buildings the rebars are the first elements to decay. This is a result of corrosion. The concrete cover preserves the integrity of the rebars in a basic (pH > 13) environment (the concrete). It protects them from aggressive agents (carbon dioxide and chloride) that reduce basicity and contribute to the formation of rust caused by the oxygen and humidity in the air.

There are three fundamental criteria that determine the cover's effectiveness in providing durable protection for the rebars: the thickness of the cover, the quality of the concrete, and its susceptibility to cracking. The architect must specify all three of these criteria very clearly and emphatically if he/she does not want the structure to run the risk of premature decay caused by rusting reinforcement. Standards covering all three of these criteria can be found in various national and European Union regulations to guide the architect in his/her specifications. These will vary according to the aggressiveness of the structure's environment.

Classifying the environment

Classifying the potential degree of aggression of the structure's environment is the crucial first step. Determining the concrete cover's thickness, its quality, and



Levi's advertisement

it susceptibility to cracking naturally depends on its environment. For example, the covering of a building high in the mountains or at the seashore cannot be the same as that of a similar building not exposed to the formation of ice or to salt air. The environmental classification, defined as "exposure class", can be found in Eurocode 2-UNI ENV 1992-1-1: criteria and specifications (Table 4.1) or in the UNI 9858 ENV 206 standard, "Concrete – performance, preparation, casting and compliance criteria, Chapter 6.2.1, Table II. Both documents list the same five environmental exposure classes and their respective sub-classes. For example, reinforced concrete structures exposed to deicing salts in winter are Exposure Class 3. Structures exposed to salt air are Exposure Class 4.

The thickness of the cover

Once the environmental exposure class is determined, specifying the thickness of the cover becomes automatic, as found in Table 4.2 of Eurocode 2 mentioned above. The criterion correlating the environmental exposure class with the thickness of the cover is very simple: the more aggressive the environment, the thicker the cover needed. In the same environment prestressed reinforced

concrete needs a cover that is 10 mm thicker than the cover for reinforced concrete. So it is very simple to determine the thickness of the cover required for a seaside hotel built of reinforced concrete (40 mm), a hotel high in the mountains (25 mm) or a hotel exposed to neither of these aggressive environments (20 mm). I recently came back from the U.S. Army Corps of Engineers aging station on Treat Island on the Canadian-American border. The visit convinced me more than ever of the enormous damage caused to reinforced concrete by inadequate covering incapable of giving the rebars long lasting protection. I saw structures there whose concrete core was completely in tact despite being exposed for over twenty years to an extremely aggressive environment (salt air AND ice), yet whose reinforcing was totally exposed to view and severely rusted due to insufficiently thick cover (25 mm).

The quality of the concrete

The second essential criterion for ensuring durable reinforcement is the quality of the concrete cover that protects it from the environment. The European Union ENV 206 standard specifies the quality of the concrete required for each environmental exposure class. Table III indicates the water/cement ratio, aggregate quality, volume of entrained air, etc. of the cement mix required to give a structure sufficient durability based on the degree of environmental aggression. Here, too, a criterion exists for determining the kind of concrete required for the particular environmental exposure class: the more aggressive the environment, the more impenetrable must it be for aggressive agents. The water/cement ratio, for example, should be no higher than 0.55 for structures exposed to freeze-thaw cycles, and .50 if exposed to deicing salts in winter.

Susceptibility to cracking

The third and last criterion, the cover's susceptibility to cracking, is the most difficult to determine of the three and is therefore the least regulated by existing standards. If a cover cracks, even one of excellent quality, aggressive agents (especially oxygen and humidity) will have easier localized access to the reinforcement. Although it is difficult to correlate the width of surface cracks with aggressive agents' gaining direct access to the rebars, it seems certain that crazing less than 200 to 300 µm wide poses no risk of the rebars' corroding.

Analyzing the most frequent causes of cracks in the cover, and excluding those caused by the pathological decay of concrete (sulphate attack, alkali-aggregate reaction) that are covered by the second criterion mentioned above, we can identify two factors that cause the development of a risky condition: the first concerns the lamentable but common practice of not curing the concrete long enough. The second involves the presence of dynamic loads.

Insufficient curing of the concrete goes hand in hand with increasingly tight construction deadlines. As long as the concrete, although "immature", is still inside its form, it is protected from temperature variations and above all from hygrometric variations that can cause dangerous premature shrinkage cracks. For example, when forms need to be reused quickly, the concrete is released too early (1-2 days), so it is not aged enough. With a compressive strength of less than 15-20 MPa the surface of the concrete should moist-cured for another 3-4 days with alternative systems (steam curing, waterproof sheets, anti-evaporation compounds) according to the recommendations in the above mentioned UNI 9858, Chapter 10.6/ENV 206 standard. The exact length of curing time depends on many environmental factors (temperature and humidity, wind velocity, etc.) and the cement used. Tables XII and XIII indicate the length of cure time for each of these factors. However, from a practical standpoint, one can refer to the following recommendation by the American Concrete Institute: the period of time the concrete is left in the forms plus the amount of moist curing time (steam, waterproof sheets, anti-evaporation compounds) should be at least seven days, or long enough for the compressive strength of the concrete to reach 20 MPa.

Cracking caused by excessive loads must be prevented by using purely structural criteria, naturally, combined with protective flexible coverings in especially severe cases, if needed, for those surfaces with insufficient tensile strength for the loads to which they are subjected.

A SUCCESSFUL OPERATION

A complete line of high-tech products specified in the ambitious design of a new hospital in Camaiore, Italy, resulted in fast, high quality construction.

by Natasha Calandrino

Photo 1
Patients in the 121,770 sq m hospital breathe the healthful air of the surrounding pine forest.

Plans had been in the works for ten years to build a large hospital in the Versilia region on the coast of Tuscany in Italy to replace four smaller ones in nearby communities. A study by the University of Venice determined that the town of Camaiore would be the best location for the hospital. As this large building was to be constructed in an environmentally sensitive area, the architects had to pay special attention to its environmental impact, especially the increased traffic the hospital would generate. A site was chosen in a pine forest off the Via Aurelia. The hospital would be housed in a low-rise building so it would be hidden by the surrounding vegetation.

The foundations

For the building to rise no higher than its surroundings, two floors of it had to be built underground. As a result the foundations had to be dug 7.50 meters (24.5 ft) deep, necessitating removal of a considerable amount of earth, 300 m (984 ft) long and 90 m (295 ft.) wide. A steel cofferdam with one or two rows of tension bars was erected to hold back the loose earth. Since the water table is 1.5 meters below the surface of the site and

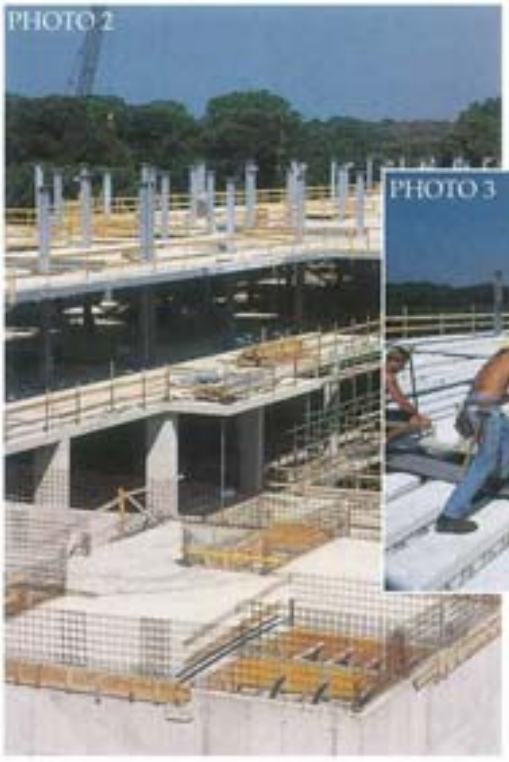


Photo 2
The reinforced concrete building consists of a grid of projecting columns and beams that support concrete planks.

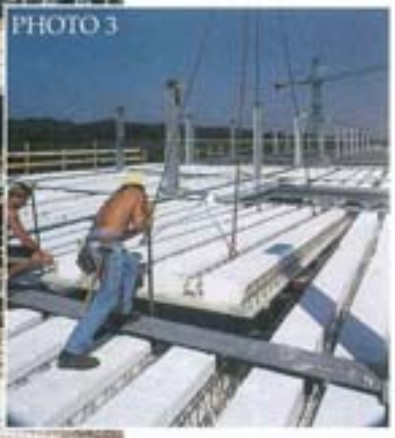
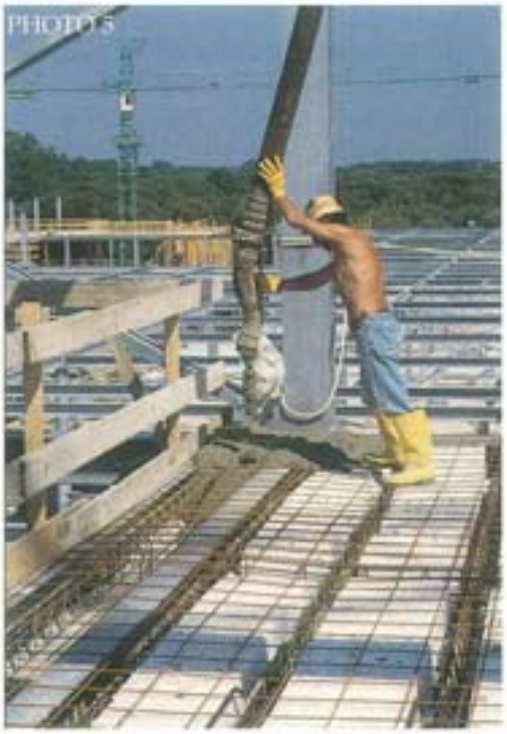


Photo 3
Placing the concrete planks on the galvanized steel beams.

Photo 4
Here we can see the hospital's repetitive structural design. A welded grid of reinforcement was laid over the concrete planks before pouring the concrete.

Photo 5
Using MAPEFLUID R104 set-retarding superplasticizer made it possible to cast 70,000 sq m of concrete in the 12 months scheduled.

Photo 6
The concrete was vibrated to prevent voids from forming.



the anchor blocks 18 meters subgrade, the entire foundation is immersed in water. For this reason a drainage system had to be installed to keep the water at bay. When the foundation was completely excavated a horizontal drainage system was installed composed of a Wellpoint pump system connected to pipes with pinhole perforations. These are encased in chases filled with special gravel to prevent the pipes from getting clogged. Over the chases lies a layer of sand one meter thick, over which a waterproofing layer of PVC was installed. A thin bed of concrete was then poured over the PVC, followed by a concrete raft 115 cm thick stiffened with a pin 2.50 meters (8 ft) thick. These precautions were taken to prevent rising damp from causing damage that would compromise the structure's durability.

The reinforced concrete building

The completed hospital has 617 beds and the latest equipment for its multiple health services on 121,670 square meters (1,309,500 square feet) of surface, making it one of the largest and best equipped in Tuscany. The building consists of a square structural grid of galvanized steel columns and beams supporting concrete plank floors, and is clad with terracotta tile.

A retaining wall was erected around the edge of the excavation as a permanent replacement for the temporary cofferdam. Even though the building is very big, it is constructed of elements that are constantly repeated, which led the concrete contractor to schedule the work in such a way as to maximize productivity. Considering the large number of beams and columns, and the 58,000 sq m (624,000 sq ft) of concrete floors in the design, the casting of the concrete and the transportation time had to be well coordinated to achieve high weekly productivity. 1,500 sq m (16,145 sq ft) of concrete was cast each week. Great attention was paid to the quality of the concrete, casting procedures and the installation of the reinforcement. These operations were managed by the project manager, following procedures agreed upon with the contractor.

Operational procedures

Before work began, two batching plants in the area were chosen for the project that continued to provide specimens of each casting later on. The quality control procedure specified that the measurements of the concrete covering be checked before casting and that these be recorded by the project manager along with the analyses of specimens taken from the concrete. The project manager, the contractor and the Mapei technicians jointly established quotas and procedures for the casting in order to maximize the performance of the concrete. From this pool of information a work schedule was drawn up with detailed instructions for mixing and placing. The final mixes designed by the technicians to meet the construction specifications were Rck30 N/mm^2 and Rck 40 N/mm^2 with 15/20 slump in elevation and Rck25 N/mm^2 with 10/15 slump in foundation. To enhance performance the concrete was admixed

with MAPEFLUID R104, a superplasticising set-retarding admixture that substantially reduces the amount of water needed in the mix. The product prolongs workability, thus reducing the amount of water added on the job site to a minimum. Less water means concrete with higher performance characteristics, and increased mechanical strength and durability.

The mix had to have extended workability even when construction continued through hot summer weather when high temperatures and the longer transportation times caused by the heavy summer beach traffic made slump loss even more of a problem. Five mixers were always on hand and additional mixers brought in as needed. At one point a total of eleven mixers were at work on the site. Two pump trucks with hoses 33 meters (110 ft) long were used to pump the mixes.

Finishing

Once the skeleton was completed work began on covering the more that 10,000 square meters (107, 600 sq ft) of the hospital facade. Just over half of the facade was covered with ventilated surfaces. The rest was clad with 25x25x1 cm (10x10x4") terracotta tiles. Here, too, Mapei supplied its technology and experience with setting materials and on-site technical assistance. The terracotta was bonded to the concrete with the KERAFLOOR+ISOLASTIC flexible adhesive system. This system was developed in the Mapei Research and Development Laboratories to provide the flexibility needed when installing tiles and slabs on substrates subject to movement, as in this case. Using KERAFLOOR+ISOLASTIC also enabled the terracotta to be installed in one go, without having to use a leveling compound over the concrete, which saved a considerable amount of time. The terracotta was grouted with KERACOLOR LARGE GRAIN, a premixed cementitious grout composed of special aggregate, synthetic resins and water-repellent additives. KERACOLOR LARGE GRAIN's easy cleanability allowed the entire facade to be grouted without staining. However, for removing traces of grout and deep cleaning of the surface, KERANET liquid was used, an acid cleaner for ceramic floor and wall tiles. KERANET was applied after wetting the surface thoroughly. The hospital's design features exterior stairways in architectural concrete. To obtain a better quality finish, the reinforced concrete was leveled with MAPEFINISH, a two-component cementitious mortar containing high strength cement, with excellent adhesion on all concrete surfaces. Once hardened, MAPEFINISH forms a compact surface with high bond strength that is impermeable to water and aggressive atmospheric gases (CO_2-SO_2, nitric oxide) and resistant to freeze/thaw cycles.

PHOTO 9

PHOTO 7

PHOTO 8

Photo 7
The surface of the pour was smoothed manually.

Photo 8
A detail of the structural system of columns, beams, planks, reinforcement and poured concrete.

PHOTO 11

Photo 9
Once the skeleton was finished, the facade was clad with terracotta tiles installed directly over the concrete with KERAFLOR+ISOLASTIC, grouted with KERACOLOR LARGE GRAIN and cleaned with KERANET liquid.

Photo 10
Detail of the exterior staircases leveled with MAPEFINISH, a cementitious mortar that forms a protective finish with high bond strength.

Photo 11
The impressive building is now ready to receive patients.

On the job site, from start to finish

The enormous size of the hospital and its sensitive location caused the project to be followed very closely both by the authorities and the public. As a result the contractors and project managers had to maintain the highest standards of quality in construction materials and methods. Mapei contributed a wide range of products that met the design's specifications from the foundation to the final covering.

TECHNICAL DATA

Project: The New Versilia Hospital in Camaiore (Lucca), Italy

Architect: Ettore Zambelli

Design and engineering of the reinforced concrete: Oreste Pedroni Ingegnieri Associati, Florence, Italy

Project Manager: Giovanni Gallo

Built: 1997-1999

Contractors: Impreglio S.p.A., Milan, Italy
CMB Carpi, (Modena) Italy
CTC (Cooperativa Costruttori Toscani), Florence, Italy

Mapei products for concrete: *
MAPEFLUID R404 admixture
MAPEFINISH finishing mortar

Supplier: General Sabbia, Viareggio, Italy

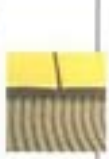
Cladding: 25x25x2 cm Il Palagio terracotta tiles

Mapei products used to install the terracotta: *
KERAFLOOR+ISOLASTIC
KERACOLOR LARGE GRAIN
KERANET liquid

Mapei Coordinators: Gianluca Bianchin, Paolo Lombardi, Nicola Sbrana

*These products are manufacture by Mapei in Europe.

The Technical Data Sheets for the products mentioned in this article are contained in Mapei binder No. 4, "Mapei Admixtures", No. 3, "Building Specialty Line", and No. 1 "Ceramic Tile Installation Products".



BIBM '99 Venezia

by Michael Keilly

On May 25 - 27 Mapei took part in BIBM '99, the International Bureau for Precast Concrete's 16th International Congress. BIBM '99 welcomed a large international audience of people from the precast concrete industry and others from related sectors at the prestigious CINI Foundation on the island of San Giorgio in Venice, Italy.

The President of the BIBM, Marcello Lavizzari, opened the proceedings on a festive note in the Hall of Tapestries with a welcome speech followed by a short concert by the Rondò Veneziano group. The theme of BIBM '99 was "Prefabricating on the Eve of the Third Millennium". Over the course of the three-day conference, reports were presented to the attendees in the same Hall of Tapestries by their authors, all of whom were experts on various aspects of concrete prefabrication. These works represented the very latest update on the management, design, technological and production aspects of the precast concrete industry, a scientific synthesis of the state of the art of precast concrete.

Mapei contributed to the pool of knowledge with a paper written by Mapei S.p.A. Research and Development Manager Pasquale Zaffaroni, and Silvia Collepardi, Luigi Coppola and Roberto Troli of Enco Engineering Concrete of Spresiano (Treviso) Italy, entitled "The influence of the superplasticizer type on the compressive strength of Reactive Powder Concrete for precast structures." The report was presented by Luigi Coppola. Mapei was represented by Admixtures Division Manager, Gianluca Bianchin, and Admixture reps Achille Carcagnì, Carlo Campinoti, Pietro Lattarulo and Aurelio Rossetti. The Congress was a valuable learning experience and an opportunity for exchanging ideas with people from Iran, South Africa, France, Argentina, Japan, Israel, Turkey, the U.K., Malaysia, Italy, of course, and many other countries, all of whom are involved in some aspect of the industry. Not least important of these were the concrete manufacturers themselves, an interesting mix (!) of large and small producers. Five hundred people were listed as full participants in the Congress and these were joined by numerous visitors.

The BIBM Awards '99 were bestowed "for outstanding precast concrete projects for their contribution to the development of the precast concrete industry and/or the promotion of the general image of precast concrete products". The Special BIBM Award '99 was given to A/S Storebaeltsforbindelsen (Denmark) for the Fixed Link across the Great Belt in Denmark. The award cited the large number of firms from various countries that were involved in the project. Mapei was one of the firms that worked on this immense feat of engineering (see article in Realtà Mapei International issue No. 5). Honorable mention was given to the Hartwall Arena multi-functional stadium in Helsinki, Finland, another prestigious project built with Mapei products (article in RM International No 6).

TAKING A STAND FOR THE FUTURE

On the eve of the new millennium Mapei has changed its approach to trade fairs, emphasizing the meeting place over the market place. Giorgio Squinzi and his team share their views.

by Alberto Mazzuca

One of the first Saie shows in the 1960'S

Mapei's first trade fair experience took place in Milan, Italy, in the early 1960's at a prefabrication show. The exhibitors were Mapei founder Rodolfo Squinzi and his son, Giorgio, a university student at the time. The stand may have been a bit plain but taking part in the show achieved very positive results. Rodolfo Squinzi then decided to continue, exhibiting at the Saie, the Italian construction industry show, among others. It was only years later that he exhibited outside of Italy, at the Bau show in Munich, Germany. Today Mapei takes part in at least sixty trade fairs a year all over the world.

"When we first started exhibiting," Giorgio Squinzi recalls, "trade shows were becoming more frequent in Italy. In fact, our major growth period coincided with the growing popularity of specialized trade shows." The reason for this increased involvement is obvious. In the past it wasn't easy to travel all over Italy contacting prospective customers one by one. To do so every company would have needed an army of salespeople, since Italy is made up of countless small and medium-sized businesses. "Exhibiting at a trade show," Dr. Squinzi explains, "facilitated initial contacts with customers. Having a stand meant bringing home hundreds of sales leads."

To some extent trade shows still perform this function today. Hans-Dieter Albreit, Managing Director of Mapei GmbH (Germany), comments that "exhibiting regularly in trade shows, in our case at the Bau in Munich and in alternate years at the Bautec in Berlin, at Domotex, and other smaller shows, is an unbeatable opportunity for breaking into new markets. Better still, it means more contacts with architects, contractors and installers, and getting to show them the quality of Mapei products. The advantage of the more important trade fairs like Bau

Saiedue - Bologna (Italy)

or Bautec, is being able to present the full range of Mapei products and to show the high degree of specialization of our products. The smaller shows like Stone-Tec in Nuremberg and Comfortex are targeted at a more specialized public."

The trade fairs are especially important in rapidly developing markets. As Zdenek Runstuck, Managing Director of Mapei Sro, Mapei's Czech Republic subsidiary, remarks, "It's really thanks to our exhibiting at the shows in the Czech Republic, the IBF in the spring in Brno and For Arch in the fall in Prague, that we've been able to reach our national sales target by being able to contact so many specifiers and prospective customers in just a few days."

IBF - Brno (Czech Republic)

In other areas, such as North America, the informative seminars that Mapei hosts at trade fairs still play a very important role. "They're a key element in all our shows," explains Nick Di Tempora of Mapei Corp (USA). "We exhibit at Coverings, World of Concrete, Surfaces and National Hardware, the four largest, plus six medium-sized shows and thirty small ones."

Giorgio Squinzi, who attends at least forty Mapei trade shows a year, points out, however, that, "Our approach has changed a great deal. Today the old concept of exhibiting in a show and coming home with hundreds of business cards is less important than it was in the seventies and eighties. This is because the function of the trade fair has changed. Today the trade fair stand has become more of a meeting place for exchanges of opinion about market trends rather than simply a platform for presenting products and information. The shows are opportunities for socializing with customers and at the same time they give everyone a chance to see the latest in products and services offered. In this respect exhibiting at trade shows is still important."

When asked if Internet, cybersales, and digital catalogues are the modern alternatives to trade fairs, Rino Civardi, the Mapei Group's Export Manager, replies, "I can't deny that these are fascinating systems, and they're being used more and more as sales support, without a doubt. But the world is full of people who still believe in face-to-face contact and sealing a deal with a handshake. Trade fairs are the ideal place for cultivating relationships that sometimes develop into real friendships."

The trade show is now seen as a valuable marketing tool that is continually being updated and adapted to fit the occasion. This change in perspective has led to a change in strategy. Ernesto Erali, Mapei Sales Manager for Italy, affirms, "Today, it's so easy to get information about new products that it's made us change our focus on trade fairs." Adriana Spazzoli, the Mapei Group's Marketing Manager, agrees. "Mapei's trade show strategy has changed considerably over the years." Enrico Orlandi, the Art Director who has worked with Mapei for the last ten of those years, comments that, "We've made the Mapei image easy to recognize, with a fixed color scheme, the now famous colored building block logo, and the special shade of 'Mapei Blue' that we often combine with mint green."

From something of a cross between a billboard and shop window, the stand has become a place for social interaction. "We communicate with our customers directly," says Rino Civardi. "We show real examples of how our various systems can be used, how to apply the products correctly and the final performance our customers can expect." For some time the Mapei Terrace Bar with its tables and umbrellas has been a fixture on Mapei trade fair stands all over the world. "The Terrace is useful for socializing with the customers," continues Civardi. "People can talk business sipping Italian espresso, and nibbling on mortadella, parmesan cheese, and other Italian specialties. It's been a enormous success."

This change in strategy led Mapei to exhibit at a greater number of trade shows and to enlarge the size of the stand. In the first six months of 1999 Mapei exhibited at twenty shows in Europe alone: four in Italy, four in Germany, two in Austria, two in Spain, and one each in Poland, Switzerland, Holland,

Belgium, Hungary, the Czech Republic, and the U.K., as well as a new show in Moscow. Mapei also exhibited this year for the first time in Buenos Aires, Argentina at "Paises in movimiento". All of the trade fairs are managed directly by the Mapei Marketing office in Milan, which takes considerable coordination as regards image and communications. "We have to promote our corporate image without neglecting local needs," says Adriana Spazzoli.

It's not easy. It takes a lot of coordinating and organization. "The managers of each subsidiary evaluate which local trade fairs we should exhibit in. They then discuss these possibilities with our Export Manager and myself. Every fall we draw up a chart of the various shows scheduled, with space left for adding others in here and there. We use structures that are easily adaptable so we can do more than one show simultaneously, even if they're far apart.

"Our basic concept is showing that we are the leading company in our industry, that we are an international high-tech firm that is very flexible and innovation-oriented and yet very attuned to local needs. And because Mapei has twenty-three subsidiaries, this requires very tight coordination of our corporate image. It sounds more complicated than it really is, since we are constantly in touch with the subsidiaries by phone, video-conferencing, Internet, etc. The trade fairs are not isolated events but an ongoing group effort where each part, each subsidiary, contributes to the work of the company as a whole. Putting it all together requires coordinating the work of many departments, Production, Technical Assistance, etc."

On the eve of the new millennium trade fairs continue to be as important as ever. "They're really vital to the life of any company," Adriana Spazzoli emphasizes, "and they're opportunities that can't be missed." These shows are invaluable opportunities for meeting our customers, seeing our competition, and interpreting future trends.

Paises en movimientro – Buenos Aires, Argentina. From left: Italian Foreign Trade Minister Fassino, the Argentinean Minister of Foreign Trade and Foreign Affairs, Di Tella, Italian Foreign Commission Director Gabbuti, and Federchimica President Giorgio Squinzi.

CARLTON HOTEL BAGLIONI

The Carlton Hotel Baglioni, Milan's new meeting place for business and fashion, was completely remodeled with fireproof materials.

Five star renovation

The newly renovated Carlton Hotel Baglioni's special connection with the world of international business and fashion can be imagined from its prime location in the so-called Fashion Quadrangle, between Milan's Via della Spiga and Via Montenapoleone, the epicenter of the Italian fashion industry. The hotel consists of two separate buildings that were built in different periods and later joined to form the original core of the hotel. When Cogeta Palace Hotels took over the management of the Carlton they decided to do a complete renovation, planning the functional aspects and the decor down to the last detail.

The company wanted to create spaces with a cozy residential atmosphere that would strongly evoke the interiors of old Milanese patrician houses, combining marble and English carpet on the floors with subdued wall treatments set off by mirrors. The Carlton manages to look very "old Milan" with its atmosphere of quiet luxury, as expressed in the quality of the hotel's finishings and furniture.

Class 2 carpeting

Luxurious materials give the rooms a refined look. The library is especially charming with its special combination of wood and fabric on the walls and patterned English carpets on the floor. 80% wool/20% nylon-blend Wilton carpet gives the bar and restaurants a very distinctive air. The carpet installation systems had to be certified in compliance with Italian regulations that specify the use of Class 2 non-flammable adhesives. Approval was given based on the results of several standard tests performed by a government-approved laboratory.

The cozy atmosphere continues upstairs in the 61 guest rooms and the two guest suites, each decorated with special care and carpeted with Axminster carpet.

An excellent "sandwich"

Fire regulations for adhesives used in public buildings like hotels require a high strength bonding system with high heat resistance. The adhesive must be applied

PHOTO 1

PHOTO 2

PHOTO 3

AQUACOL T was applied over the 6-mm thick rubber mat (Photo 1) before laying the carpet. AQUACOL T is a non-flammable, non-toxic water dispersion adhesive (Photos 2 and 3).

evenly throughout the installation. In the Carlton Hotel Baglioni a carpet mat of natural rubber was installed under the carpet to reduce impact noise between floors. The "sandwich" of products approved by the authorized laboratory included a levelling coat of NIVORAPID* applied over the cement screed. NIVORAPID is a powder composed of special cement-based binders, selected aggregate and synthetic additives manufactured from a formula developed in the Mapei Research and Development laboratories. NIVORAPID's ultra-fast drying time allowed the 6-mm thick rubber mat to be installed only 4 hours after application. AQUACOL T* was used to install the mat. AQUACOL T is a non-flammable, non-toxic water dispersion adhesive. The same adhesive was used to install the carpet. AQUACOL T is one of a new generation of adhesives that has replaced adhesives containing solvents. It has higher bond strength and resistance to wear. Its performance as a top quality finishing material met the high standards of Cogeta Hotels which demands only the best for its guests.

Parts of this article were adapted from "Suite" magazine, with our thanks.

TECHNICAL DATA

Carlton Hotel Baglioni – Milan, Italy

Built: end of 19th century

Remodeled: 1997

Architect and Project Manager:
Eugenio Gerli

Interior Design: Prof. Renato Livi

Contractor: Minotti Impresa di Costruzioni, Alba, Italy

Materials: Domus Market Italia

Mapei Products:*
NIVORAPID
AQUACOL T

Mapei Coordinator: Davide Ottolini

*The products mentioned in this article are manufactured by Mapei in Europe.

The Technical Data Sheets for the products mentioned in this article are contained in Mapei binder No. 2, "Resilient Flooring Line".

MAPEI GLOBAL INFONET

A new edition of Mapei's electronic catalogue.

by Raffaele Gerbi

At the Cersaie '99 in Bologna, Italy, from 28 September to 3 October, Mapei presented the second edition of MAPEI GLOBAL INFONET, the multi-media CD-ROM that contains both English and Italian language versions of the electronic catalogue for all Mapei product lines manufactured worldwide (with the exception of the Americas, where the names of many Mapei products differ from similar Mapei materials sold in Europe, Asia and Australia. Mapei customers in the Americas should refer to the Mapei InfoWEBSITE at http://www.mapei.com).

MAPEI GLOBAL INFONET is a multi-media presentation where you can learn about Mapei's product lines, complete with technical data sheets, key installations and company locations around the world in words, pictures and video. The following hardware is recommended for the CD-ROM:

- 166 MHz Pentium Processor
- 32 Mb RAM memory
- 8x CD-ROM reader
- 2 Mb RAM video card
- 16 bit audio card
- printer

and the following software:

- Windows 95/98/ NT
- Acrobat Reader 3.0
- Internet Explorer 4.0 (to avoid graphic distortion created by the 3.2 version).

You can install Acrobat Reader from the CD-ROM. To do so:

- Go into resource management
- Select the CD-ROM drive unit
- Select Mapei 1
- Select Ie40
- Select 1e4setup

The new version of MAPEI GLOBAL INFONET contains a programme featuring the 26 new colours of "The Coloured Grouts 2000" with some examples of how you can change the look of a room just by changing the colour of the grout in a tile installation. To install the programme:

- Open the "Fughe" ("Grout") file
- Open the "Setup.exe" file and follow the instructions.

Select ? Mapei ? Coloured Grouts 2000 and you'll see the full range of Mapei products for grouting, complete with technical data sheets for: KERACOLOR, ULTRACOLOR, KERAPOXY, MAPESIL AC and MARMOCOLOR. The programme comes with images of 24 different environments where you can try out different grout colours on floors and walls, with photographs courtesy of Marazzi, Marca Corona, Emil Ceramica, Fincibec, Rex Ceramiche Artistiche, and Sichenia Gruppo Ceramiche.

MAPEI GLOBAL INFONET will be updated periodically. Now in English and Italian, it will soon be available in German, French and Spanish.

For further information contact Raffaele Gerbi at:
Mapei SpA Headquarters - Marketing Dept.
E-mail: mapei@mapei.it or marketing@mapei.it
Tel. ++39.02.37673.1 - Fax ++39.02.37673.214

WHAT A DIFFERENCE A NIGHT MAKES

Many supermarkets and shopping centers have replaced their ceramic tile floors in record time with the Mapei rapid system, including the Auchan chain of supermarkets.

by Gilles Bollé-Reddat - Mapei France

PHOTO 1

Ceramic tile floors in supermarkets and shopping centers take a lot of punishment from shopping carts and heavy foot traffic. The managers of the Auchan stores in Bois-Sénart (Seine et Marne), France, decided to replace 1,100 square meters (12,000 sq ft) of worn tiles. The tight deadline for the completion of the new floor (a situation frequently encountered on this kind of job) led the project managers to select fast-setting Mapei products, MAPECEM* and GRANIRAPID*. These materials were successfully used two years earlier in another Auchan chain store remodeling. The same product combination has been used in supermarkets in many other French cities (Annecy, St. Etienne, et al.) in the last ten years. MAPECEM and GRANIRAPID constitute a rapid system that is especially recommended for locations like shopping centers with a UPEC classification of U4-P4S, because it enables ceramic floors to be installed in record time. In Bois-Sénart the contractor did the remodeling at night so shoppers would not be inconvenienced.

PHOTO 2

PHOTO 3

Lightning-fast installation

The site was divided into 3 areas measuring 170 to 220 square meters (1,800 to 2,500 sq ft) so that the existing floor could be demolished, a new screed prepared, and porcelain tiles set and grouted in just one night, from 10 p.m. to 8 a.m. To work as quickly as possible, a rapid system was used composed of MAPECEM, GRANIRAPID and ULTRACOLOR*, high performance products that are unequalled by other brands of ceramic tile installation materials on the market. With MAPECEM fast-setting hydraulic binder, the screed was ready for traffic in only 4 hours. Since the screed was to be less than 50 cm thick, a bond coat of MAPECEM modified with PLANICRETE was first applied to the slab (Photo 1). PLANICRETE* is a synthetic rubber latex that improves adhesion on all surfaces. Mortar for the screed (Photo 2) was mixed with 350 kg of MAPECEM per cubic meter of sand (from 0 to 8 mm in diameter), then struck off (Photo 3) and smoothed with a finishing machine (Photo 4). MAPECEM dries so fast that installers have to adjust their timing to the fast-setting nature of this hi-tech product. Using special pumps to place the mortar (Photo 5), the installers were able to finish the first 170 square meter screed in only 4 hours. They then began setting the porcelain tiles with the GRANIRAPID adhesive system.
This high hydrating product is ready for light traffic in only 4 hours (at +20° C) and is ready for heavy traffic in 24 hours. Mapei's recommendations for installing

uchan

tiles in U4-P4 locations (areas in shopping centers constantly subject to heavy traffic) and U4-P4S locations (supermarkets and industrial kitchens constantly subject to heavy traffic) form a specification ("cahier de charge 9131") that is approved by the SOCOTEC control office (No. CX 5206). The wording of this specification is available through the Mapei Technical Service. Increasingly used in France, Italy and other countries, the MAPECEM / GRANIRAPID / ULTRACOLOR system continues to astound customers with its outstanding performance. This product line is ideal for super-fast remodeling projects in large shopping centers, a developing market in which Mapei has many years, and countless square meters, of experience all over the world.

PHOTO 4

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

PHOTO 5

Making a night of it with rapid systems

Each night it took:
3 hours to demolish the existing tile installation and screed
4 hours to prepare the new MAPECEM screed
4 hours to set the tile with GRANIRAPID and grout it with ULTRACOLOR (installers were screeding at one end of the store while the tile was being set at the other)

From start to finish

in 12 hours: the installation was ready for light traffic.
in 24 hours: the floor was ready for heavy loads.

TECHNICAL DATA

Project: Auchan Shopping Center in Bois-Sénart, France

Architect and Project Mgr: Auchan Technique Conseil – Villeneuve d'Ascq, France

Remodeled: 1997

Tile contractor: France Sols

Materials: 15x15 cm (5x5") Arcédis porcelain tiles

Mapei products used*:
MAPECEM
GRANIRAPID
ULTRACOLOR

Mapei Coordinator: Philippe Latrace

*These products are manufactured by Mapei in Europe.

PORCELAIN TILES IN HEAVY TRAFFIC AREAS

by Francesco Stronati

Porcelain tile is being used more and more in construction because it has high mechanical strength, is extremely hard, and it absorbs virtually no water. It is often used in heavy traffic areas: factories, warehouses, airports, etc. There are two basic ways to install this material: with a conventional mortar bed or with adhesives. Adhesive systems have become increasingly popular in the last forty years because they make floor installations highly durable. Let's take a closer look at floors in heavy traffic areas.

30x30 cm (12x12") Floor Gres porcelain floor tiles in the Sistine Galleries, Vatican City

The right substrates

The first step in installing a durable floor with adhesive is a having a substrate with sufficient mechanical strength to withstand the load of traffic in the location. In this article we'll consider cement-based mortar or concrete substrates.

Concrete slabs

Tiles can be installed directly on concrete slabs or on precast concrete planks, provided they are stable, i.e. after they have gone through most of their natural movement stage: drying shrinkage, plastic deformation, settling, etc. In our experience this stage is reached only after six months of curing.

Cementitious screeds

There are two basic kinds of screeds, floating and bonded. Floating screeds can be 5-10 cm thick, depending on the load of traffic and the compressive strength of the cement mix used. The compressive strength should not be less than 25 MPa. The screed should have sufficient reinforcement when poured over compressible layers of material like soundproofing or heating insulation. Porcelain tiles should not be installed until the screed has cured at least 28 days in warm weather. In this way any cracks resulting from natural drying shrinkage have already occurred. Otherwise these cracks would affect the tile installation. Curing time can be reduced by mixing the mortar with special high-hydrating binders that harden fast with virtually zero shrinkage. Using MAPECEM binder, tiles can be installed only four or five hours after screeding. TOPCEM binder has been recently formulated for preparing mortars that stay workable as long as conventional mortars but allow tile to be installed only 24 hours after screeding. These binders make screeding easy even in hot weather.

For bonding screeds to the underlying concrete slab, epoxy resins like EPORIP can be used, or PLANICRETE, a cementitious latex-modified bond slurry that improves adhesion. It is essential that screed be poured before the EPORIP or the PLANICRETE slurry is dry. Joints must be formed in bonded screeds following the same pattern as the joints in the underlying slab. The tiles can be set after the cementitious substrate has been cured one week for each centimeter of thickness. This amount of time can be reduced if MAPECEM or TOPCEM is used for screeding.

Setting porcelain tiles

Before setting the tiles, any cracks present in the substrate should be monolithically sealed with EPORIP to prevent movement of the slab or screed from causing the tiles to crack. The substrate must be sufficiently flat, with no more than 3 mm of variation in a length of 3 meters.

Adhesives with high compressive strength should be used in locations subject to heavy traffic. For large tiles in areas subject to thermal shock (e.g. spills of boiling water, etc.) highly flexible adhesives such as KERACRETE or GRANIRAPID are needed. Flexibility is also essential for tiles set directly on reinforced concrete slabs that are subject to moderate vibration or deformation. Only a flexible adhesive can guarantee a long lasting installation and absorb

*30x30 cm (12x12")
Floor Gres porcelain
floor tiles in the
Heineken Brewery in
Comunuovo,
Bergamo, Italy.*

Screed	Adhesive	Grout	Sealant
MAPECEM	KERACRETE	KERACOLOR	MAPEFLEX PU21
TOPCEM	GRANIRAPID	ULTRACOLOR	MAPEFLEX PB27
EPORIP	ADESILEX P4	KERAPOXY	
PLANICRETE			

movements without cracking. In any case, care must be taken to apply enough adhesive to completely cover the tile back. Voids can cause tiles to crack when a heavy load passes over them. The backbutter and float method should be used for tiles larger than 25x25 cm (10x10") to ensure complete transfer of the adhesive. Apply the adhesive both on the substrate and on the back of the tile. ADESILEX P4 is a specially formulated "self-backbuttering" adhesive with high mechanical strength and good flexibility whose special self-leveling properties ensure complete transfer of the adhesive even on large-sized tiles. This eliminates having to backbutter the tiles. Using ADESILEX P4 enables the installer to work even faster because there is no need to beat in the tiles.

Grouting

The grout lines should be wide, and the larger the tiles, the wider the grout lines. Besides compensating for slightly irregular measurements in the tiles, joints are needed to prevent potential compression of the flooring (caused, for example, by excessive flexion of the underlying slab) from making the tiles crack or come loose. The tile installation must include the same structural joints that are present in the substrate. Either a cementitious or an epoxy grout can be used. Epoxy should be used for tile installations in highly antiseptic locations or floors that are subject to acid spills. High quality grout is especially important to prevent acids from attacking the adhesive and the underlying substrate. Specially formulated cement-based ULTRACOLOR grout is ready for traffic only three hours after application and does not cause surface efflorescence that can alter color. Flexible sealants that can withstand heavy traffic, like MAPEFLEX PU21 or MAPEFLEX PB27, should be used for expansion joints.

30x30 cm (12x12") Imola porcelain floor tiles in the Schiller Opel dealership in Budapest, Hungary

20x20 cm (8x8") Graniti Fiandre porcelain floor tiles in the Ferrari plant in Maranello, Modena, Italy

This article was adapted from a report presented at a conference entitled "Porcelain tiles" hosted by the Faenza Editrice in June 1997.

N.B. The materials mentioned in this article are part of Mapei's European product lines.

★★ ★★ CASALE

The Hotel Casale in Colli del Tronto, Italy, is housed in a 17th century farm complex that was restored with a combination of traditional materials and the latest installation techniques.

by Francesco Stronati

Although Venice, Florence and Rome are enchanting places that no traveler should overlook on his or her Italian travel itinerary, these are not the only must-see destinations. Italy offers countless other opportunities for expanding one's horizons, magical places where visitors can lose themselves amidst beautiful, unspoiled landscapes for a privileged glimpse at a side of Italy most tourists never see.

Travelers looking for relaxing yet culturally rewarding vacations should not miss the Hotel Casale, a holiday hideaway and health resort located in central Italy near Ascoli Piceno, an area rich in history and hospitality. The hotel offer its guests luxurious accommodations in a carefully restored complex of farm buildings dating back to the 17th century, in an atmosphere that combines the rustic and the refined.

PHOTO 1

Modern comfort with traditional flavor

Proper installation methods and the right adhesives were required to install the hotel's sumptuous floor and wall coverings. 15x30 cm (6"x12") and 7.5x30 cm (3"x12") terra cotta tiles were selected for the approx. 4,000 square meters (46,000 sq ft) of paths and patios in a warm shade that harmonizes perfectly with the Casale's 17th century architecture (Photo 1). After the sand and cement substrate was completely cured the terra cotta was installed over it with KERAFLOOR* mixed with ISOLASTIC* diluted 1:1 with water. KERAFLOOR is a cement-based adhesive that can be applied in thicknesses of up to 15 mm, so it ensures thorough transfer of the adhesive to the entire back of the tile, compensating for small irregularities in the substrate and on the

PHOTO 2

PHOTO 3

PHOTO 4

MAPESIL AC is an acetic silicone sealant whose flexibility enables it to absorb deformations up to 20%. This makes it ideal for withstanding the movements caused by thermal expansion of the floor.

Interiors with inlaid accents

Terra-cotta was also used inside the hotel. It picks up the warm tones of the old buildings and provides continuity with the exterior (Photo 2). The tiles were installed with KERAFLOOR mixed with water. Various natural stone inlays of Ascolano and Persian travertine, yellow Siena marble, red Verona marble and other stones were used to give the floor a richer look. GRANIRAPID, a fast-setting and hydrating adhesive system, was used for these special installations. It dries so fast that stone can be set without staining. Other types of marble were used in areas such as the hotel dining room which offers typical local cuisine (Photo 3). The room's Venetian pattern of Bianco di Carrara and Verde Alpi marble necessitated using two different types of adhesive. The Bianco di Carrara was set with GRANIRAPID*, while the Verde Alpi was installed with KERALASTIC*, a two-component polyurethane adhesive, because thin slabs of Verde Alpi warp very quickly in the presence of moisture, even the small amount contained in the adhesive before it has time to set. The result is a floor with small undulations that is not thoroughly bonded to the substrate. KERALASTIC contains no tile back. Mixing KERAFLOOR with ISOLASTIC substituted for part of the mix water gives the adhesive the flexibility needed to absorb the various movements between the floor and the substrate caused, for example, by thermal shock.

The 8 mm joints were grouted with KERACOLOR LARGE GRAIN*, a factory-prepared cement-based grout that was applied over the entire surface of the tiles. This was done so it could penetrate evenly into the pores of the terra-cotta and not just fill the joints. Expansion joints were placed in a grid pattern of approximately 6x6 meters (19'x19') and sealed with MAPESIL AC* after first applying PRIMER FD* to the edges of the tiles.

PHOTO 5

water so it can be used to install moisture-sensitive stone without warping.

The hotel's beautiful location amid rolling green hills convinced its owners to open a multi-functional Beauty Farm on the site (Photo 4). Bianco di Carrara, Asiago and Verde Alpi marble was installed on the floors throughout the spa and in the bathrooms. GRANIRAPID was used for the Bianco di Carrara, and the Asiago, and KERALASTIC for the Verde Alpi, as in the hotel dining room. GRANIRAPID was also used to install clinker flooring in the two meeting rooms of the hotel. The Ascoli travertine was set with KERABOND*, a powdered ceramic tile adhesive (Photo 5).

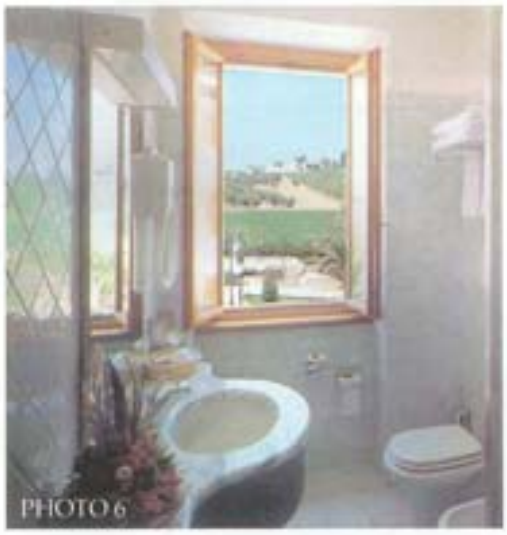


PHOTO 6

PHOTO 7

Waterproofing

Single-fired 20x20 cm (8"x8") and 10x10 cm (4"x4") ceramic tiles were used in the bathrooms of the hotel's 70 antique-furnished guest rooms. The tiles were installed with KERABOND and the 4 mm wide joints were grouted with KERACOLOR modified with FUGOLASTIC*, a water dispersion of synthetic latex polymers. When FUGOLASTIC is used instead of water to mix KERACOLOR, it makes grout more compact and more watertight while increasing its resistance to abrasion. The tiles were installed on the diagonal to form a subtly colored latticework pattern (Photos 6 and 7).

The outdoor Olympic pool (Photo 8) needed to be waterproofed before installing ceramic tiles. After leveling the sides and bottom with a cementitious mortar, a 2 mm thick coat of MAPELASTIC*, a two-component flexible waterproofing mortar was applied with fiberglass mesh reinforcing. When the MAPELASTIC was dry (4-5 days after application) GRANIRAPID was used to install 12x24 cm (4.5"x9.5") clinker tiles. These were then grouted with KERACOLOR mixed with FUGOLASTIC.

Expansion joints in the corners were primed with PRIMER FD, then sealed with MAPESIL AC. The indoor pool was also waterproofed with MAPELASTIC

PHOTO 8

PHOTO 9

before installing glass mosaic tiles with GRANIRAPID. The tiles were grouted with KERACOLOR+FUGOLASTIC (Photo 9).

Future tradition

Restoring these too often neglected relics of our agricultural past enables us to preserve them for future generations. These estates, handed down from father to son over the centuries, often contain a rich mixture of many different styles of architecture, as new buildings were built and old ones altered and added onto. Respecting their original rural character requires not only intelligent architectural planning but also the use of technologically advanced methods and products to achieve high performance results with traditional materials.

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

TECNICHAL DATA

Hotel Casale - Colli del Tronto (Ascoli Piceno), Italy

Built: 17th century

Restored: 1990-1995

Project manager: Nicola Tavoletti

Contractor: Pietro Vagnoni, Castel di Lana (Ascoli Piceno), Italy
Material used for the exterior floors:
15x30 cm and 7.5x30 cm Montecchi terracotta
Mapei products for installing the exterior terracotta:*
KERAFLOOR+ISOLASTIC
KERACOLOR LARGE GRAIN
Mapei products for the expansion joints:*
MAPESIL AC and PRIMER FD
Material used for the interior floors:
Smorlese terracotta, natural stone, clinker, Ascoli travertine
Mapei product for installing the terracotta in the interior:*
KERAFLOOR
For the natural stone and marble:*
GRANIRAPID
For the Verde Alpi marble*:
KERALASTIC
For the clinker*:
GRANIRAPID
For the Ascoli travertine:*
KERABOND
Material used for the bathrooms*:
Ragno 20x20 and 10x10 cm single-fired tiles
Mapei products for the bathroom installations:*
KERABOND
KERACOLOR+FUGOLASTIC
Material used for the outdoor pool:
12x24 cm Sire clinker
Mapei products for waterproofing, installation and expansion joints in the outdoor pool:*
MAPELASTIC
GRANIRAPID
KERACOLOR+FUGOLASTIC
MAPESIL AC and PRIMER FD
Material used for the indoor pool:
Bisazza glass mosaic
Mapei products for waterproofing and installation in the indoor pool:*
MAPELASTIC
GRANIRAPID
KERACOLOR+FUGOLASTIC

Mapei coordinator: Gianmarco Felicetti

*These products are manufactured by Mapei in Europe.

THE FLYING CARPET

A colorful mosaic carpet was commissioned for the 300th anniversary of the founding of Cervia Nuova, Italy.

The little city of Cervia Nuova on the Adriatic coast of Italy is know as the City of Salt because of the surrounding salt pans that were the area's main source of income for hundreds of years. The city council commemorated the 300th anniversary of the city's founding by commissioning a public fountain to stand next to the city's old salt warehouses. The poet and set designer Tonnino Guerra conceived a work of art in mosaic tile reminiscent of the magnificent Byzantine mosaics of nearby Ravenna to symbolize the city's historical identity. "The civilization of the salt-pans is being swept away, along with its sorrows and its poetry. The beaches, the sand dunes and the song of the reed birds are disappearing, leaving behind their melancholy memory," declared Guerra.

Guerra designed a large irregular-shaped pool filled with a foot and a half of water from the center of which gush jets of water that send aloft a flying mosaic carpet. On top of the carpet are two piles of salt and a bunch of reeds. The carpet and its contents represent the elements of a vanishing way of life that once filled the area with a special poetry. The work was executed by the talented hands of Marco Bravura and appears to waft on the foaming water underneath. Actually, the glass and enamelled mosaic pieces are fixed to a sheet of stainless steel 3 mm thick and were set with KERALASTIC, a two-component polyurethane adhesive that simultaneously bonds and waterproofs ceramic and mosaic tile as well as natural stone.

The center of the carpet consists of symbolic motifs that recall the seashore, the salt-pans and the still waters of the tidal flats, the whisper of the wind through the sea pines, the rustle of the reeds and the long cries of the shore birds, the colors of the trees and the brilliant sunsets reflected in the water, the white of the dried salt deposits, and the hard glint of the sun on the sea. The carpet is bordered with geometric designs to represent the salt workers' lives that Marco Bravura has transformed into a dreamlike vision.

1. Positioning the piles of salt made out of fiberglass, Carrara marble and crystal. Marco Bravura is pictured here working under the vigilant eye of poet and set designer Tonino Guerra.

2. The carpet features a sophisticated pattern of richly colored enamelled mosaic tiles with metallic highlights in gold, silver and copper.

3. Checking the altitude of the flying carpet during construction of the fountain.

TECHNICAL DATA

The Flying Carpet Fountain - Cervia (Ravenna), Italy

Built: 1997

Concept: Tonino Guerra

Mosaic work: Marco Bravura

Design and artistic/technical consultants: Rita Ronconi, Claudio Lazzarini, Marco Bravura

Commissioned by: The Cervia City Council

Mapei Product* KERALASTIC supplied by the Pirini Co., Ravenna, Italy

Mapei Coordinator: Maurizio Costanzi

*This product is manufactured by Mapei in Europe.

The Technical Data Sheet for the product mentioned in this article is contained in Mapei binder No. 1, "Ceramic Tile Installation Products".

SILEXCOLOR and SILE

A complete cycle of "breathing" modified silicate protective paints and plasters.

by Paolo Sala

Soluble glass for building facades? Soluble glass, or waterglass, is a chemical term for stabilized, modified alkaline polysilicates (usually potassium silicate) that are solubilized in water. Like glass, these are derived from silica or quartziferous sand when silicon dioxide is fused with potassium carbonate at more than 1300°C. They are then solubilized in water at high pressure and temperature in revolving autoclaves.

The modified potassium silicate becomes the mineral binder used in SILEXCOLOR*. When the product is applied it undergoes a process of "silicization", reacting with the basicity of the substrate and the carbon dioxide in the atmosphere, so that the SILEXCOLOR pigments and fillers form a single body with the surface and consolidate it. This fusion with the surface is unique to silicate-based paints and can be seen in the electron microscope photograph (Photo 1): Part A on the left side shows how SILEXCOLOR does not simply form a film that it deposits on the substrate but chemically reacts with it, unlike conventional film-forming paints, as seen on the right in Part B. SILEXCOLOR does not close up surface pores, so it does not flake or separate.

PHOTO 2

PHOTO 3

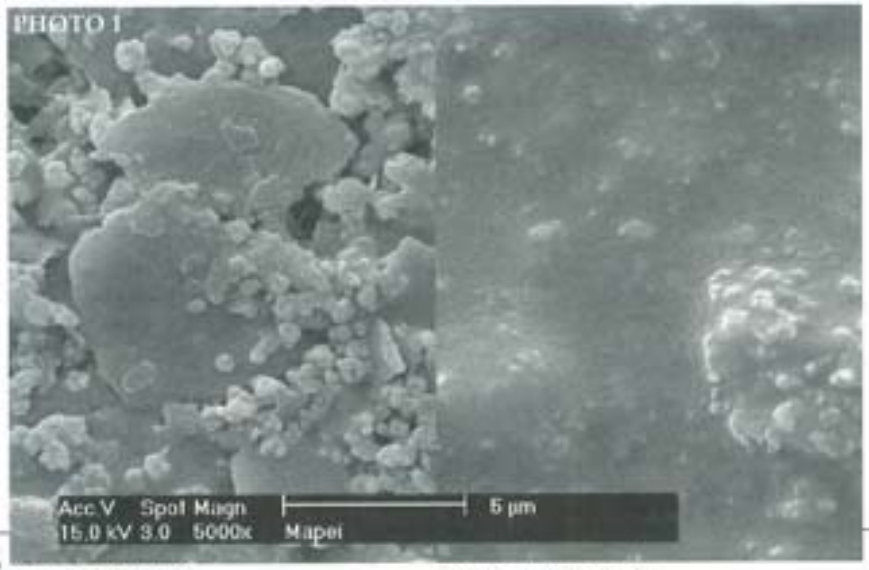
Permeability to water vapor

A surface finish should not offer excessive resistance to the flow of water vapor filtering through the substrate: the surface needs to breathe. The finish should have a low resistance to the passage of water vapor, defined as "Sd", that determines how many meters thick a layer of air must be to have the same resistance to the passage of water vapor as a material of a given thickness. Being highly permeable to water vapor becomes essential when using dehumidifying mortars such those of the MAPE-ANTIQUE product line. The application of the SILEXCOLOR silicate cycle, with its permeability to water vapor of 360 g/m² in 24 hours (according to DIN 53122), does not impede the transmission of moisture through the substrate/finish system. This prevents bubbles from forming and the buckling that can occur with conventional paints.

Waterproofing

The surface finish of the sub-

PHOTO 1



This scanning electron microscope photo shows cementitious plaster treated with the SILEXCOLOR cycle (Part A) and with conventional film-forming paint (Part B). Magnified the same number of times, Part B shows that the pores are completely closed and the surface has a flat, cloudy appearance.

Part A SILEXCOLOR Part B conventional paint

XCOLOR TONACHINO

strate must repel rainwater. This impermeability is the resistance of the film to the passage of water and is defined in DIN standard 52617 as W, i.e. kg/m² of water penetrating, divided by the square root of the unit of time: the higher the level of W, the lower the water repellency. The crystallization of the potassium silicate in the SILEXCOLOR cycle repels rainwater because it increases the impermeability of the substrate.

The formula for a dry wall

According to the Kuenzle theory used in the DIN 18850 standard, a wall can be considered moderately dry if the product Sd x W is less than or equal to 0.1, where Sd should be less than or equal to 2 m and W less than 0.5 kg/m² x h 1/2. The SILEXCOLOR cycle complies with this standard in that the finish does not obstruct the passage of water vapor.

Resistance to aggressive chemicals

The protection provided by the SILEXCOLOR cycle is enhanced by the mineral coating's insensitivity to acid rain. Unlike lime-based products SILEXCOLOR is insensitive to the disintegrating action of sulfuric acid that attacks paint films containing calcium carbonate.

COMPARISON OF FINISHES

	W	Sd	W x Sd
Washable paint	≥ 0.25	> 1	> 0.25
Plastic coating	≥ 0.15	> 1.5	> 0.225
Silicate paint	< 0.5	≥ 0.05	< 0.025
Silicate coating	< 0.25	≥ 0.25	> 0.062

Note
W = permeability to water
Sd = permeability to water vapor

PHOTO 4

The function of the SILEXCOLOR cycle

Besides having a protective function, the SILEXCOLOR silicate cycle has a cosmetic one. It improves a building's appearance without altering its functional characteristics. SILEXCOLOR's inorganic pigments are highly stable under ultra-violet radiation because they are insensitive to the mineral binder's basicity. SILEXCOLOR comes in 34 colors and is easy to apply, so it is ideal for antique finishes such as glazing. SILEXCOLOR repels dirt because it forms a single body with the substrate, so the treated substrate stays clean and protected. Using it in interiors prevents mildew.

SILEXCOLOR TONACHINO

In addition to SILEXCOLOR silicate paints, Mapei has developed SILEXCOLOR TONACHINO*, a trowelable ready-to-use paste that effectively covers irregularities in the substrate. This product is indispensable when using dehumidifying plasters. Replacing decayed plaster up to a certain height on a wall generally creates surface irregularities that SILEXCOLOR paint alone cannot cover. SILEXCOLOR TONACHINO is available in the same 34 colors as SILEXCOLOR paints and combines the Italian tradition of plaster craftsmanship with the latest in silicate technology.

How to use SILEXCOLOR and SILEXCOLOR TONACHINO

Silicate finishes can be used on all mineral substrates except gypsum and gypsumboard, i.e. cement- or lime-based plaster and all dehumidifying mortars. Existing film-forming paint interferes with the "silicization" reaction, so it should be removed before applying the silicate cycle. The substrate must be cured, dry and clean before applying a coat of SILEXCOLOR PRIMER (Photo 2). The SILEXCOLOR itself may be diluted with SILEXCOLOR PRIMER only and applied with a roller or brush (Photo 3). SILEXCOLOR TONACHINO is trowelled on as is with a metal trowel, then smoothed with the trowel itself or with a sponge float. Photo 4 shows a building treated with the SILEXCOLOR cycle. For antique glazing finishes, two or more color washes of varying shades should be applied to obtain the glazed effect on the facade.

The SILEXCOLOR and SILEXCOLOR TONACHINO technical data sheets are contained in Mapei binder No. 3, "Building Specialty Line".
**These products are manufactured by Mapei in Europe.*

From the GIRO to the TOUR to the VUELTA

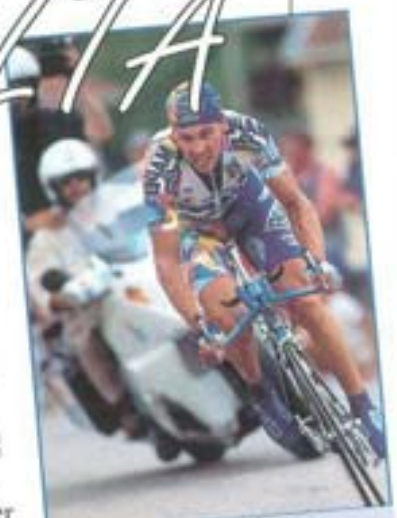
by Alessandro Brambilla

1999's three major stage races proved that the pro teams and riders needed to change their attitude towards the use of illegal drugs in cycling. The Mapei-Quick Step team's commitment to drug-free cycling sometimes cost them dearly in terms of popularity.

In the team's five year career Mapei achieved one first place victory in the Giro d'Italia (Tour of Italy), two second places, and a third place finish, with Rominger, Tonkov and Olano, respectively. This year the team's many commitments led Mapei to send some of the team's younger riders to the Giro. Andrea "The Gladiator" Tafi was the only senior member of the team to race in the Giro. The liveliest of the Mapei-Quick Step men in the Giro was Paolo Bettini of Leghorn, Italy who came close to winning a stage many times, meanwhile sporting the Giro's "Mountain Grand Prix" green jersey for eighteen days.

Bettini between the "Miss" of the Giro d'Italia (Tour of Italy).

After the Giro the team participated in the Tour de France. The great Tom Steels brought Mapei first place victories in three stages. Steels triumphed at the second stage finish in Saint Nazaire, the third stage in Laval and the seventeenth in Bordeaux. The Tour was won by the American Lance Armstrong in a miraculous comeback performance. Daniele Nardello was the Mapei team's best performer, finishing the Tour in seventh place. Fortune spurned Mapei-Quick Step rider Pavel Tonkov, winner of the 1996 Giro d'Italia. In the ninth stage Pavel fell on the descent of Monginevro. The pain made him lose precious time, weakening his performance in subsequent stages, even though 24 hours after his painful finish in Sestrière Pavel took second place at the finish line on the Alpe d'Huez. Between the Alps and the Pyrenees the other Mapei Quick Step athletes took to the attack, among them Paolino Lanfranchi and Gianni Faresin. Lanfranchi finished fourth in Albi. Faresin finished second at St. Gaudens, aced by the clever maneuvering of Dmitri Konyshev. In the St. Gaudens to Piau Engaly stage in the Pyrenees, Nardello became the man to watch in the general classification.


Tonkov in action at the tour.

Nardello winning on the Pyrenees.

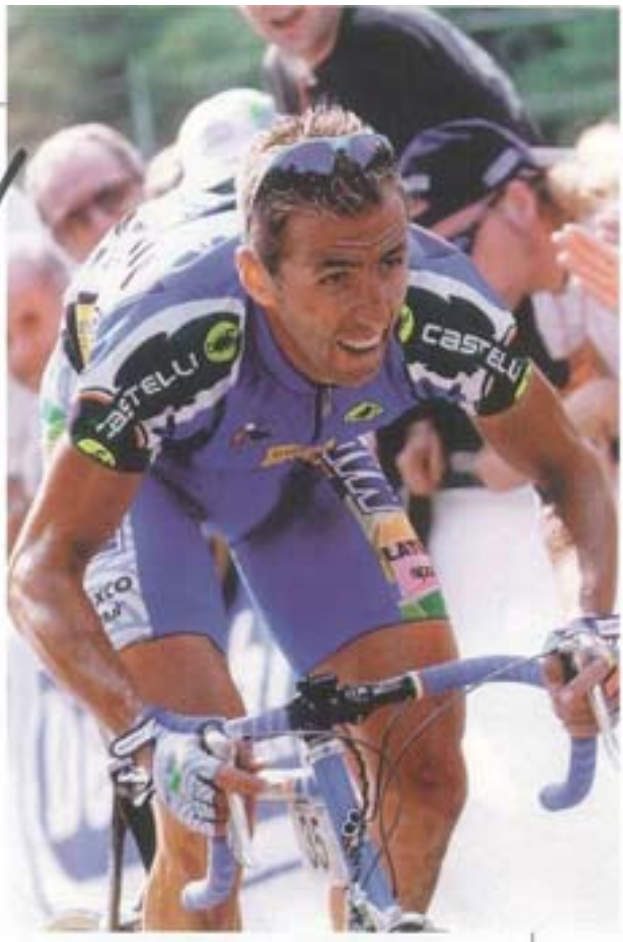
48 hours from the conclusion of the tour Daniele was in 6th place, 13'19" behind Armstrong with only the 143 km.-long final stage from Arpajon to Paris left to go. But after Arpajon luck seemed to turn against him. "Coming out of a curve I went head on into a bale of hay!" explained Daniele. "I lost a whole minute and that mistake set me back a notch in the general classification." On the Champs Elysées in Paris Nardello finished the Tour in seventh place in the final classification, 17'2" behind the yellow jersey, Armstrong. In '97 Nardello finished seventeenth in the Tour, winning a stage. In 1998 he finished eighth. "In the year 2000, I guarantee I'll be in the top five!" promises Nardello. Lanfranchi proved himself to be a valuable asset to the team and came in eighteenth in the final classification.

After the Tour de France, Mapei-Quick Step competed in the Vuelta a España

Nardello showed what great stuff he's made in the 201 km.-long eleventh stage from Huesca to Pla de Beret in Val d'Aran when Nardello beat Peña out in the sprint.

In the Vuelta a España the team's top performer was Pavel Tonkov. Pavel just missed winning a stage on the Alto de Angliru, the most fearsome of the Vuelta's steep climbs. Tonkov was alone out front when he was slowed down dodging the race organization motorcycles in the last stretch and then overtaken by Jimenez in the final sprint. At the finish of the Vuelta in Madrid Tonkov was in fourth place in the final classification, 7'53" behind the German Jan Ullrich.

Still in the lead

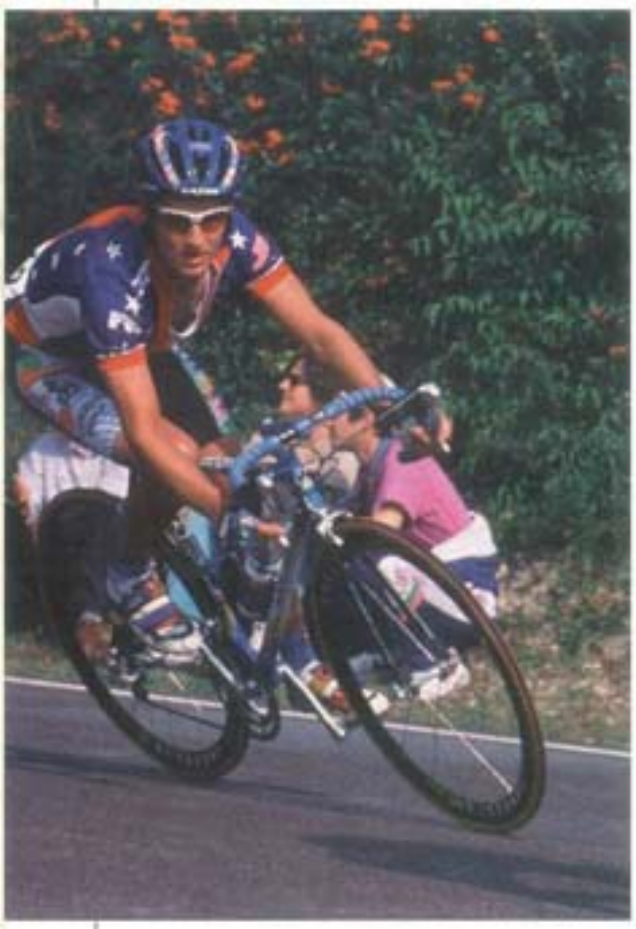


Mapei-Quick Step ended the 1999 road racing season with 51 victories. Even though this number is far from 1997's total of 95, the team won more road races worldwide than any other team, as it has for the last 6 years. From January of 1994 to the end of October 1999 Mapei won 435 races. For the last five years the team has been at the top of the International Cycling Union classification, a record to be proud of.

Bartoli's accident, in which he fell and broke his right kneecap at the Tour of Germany, put an end to his season on 2 June and ruined a large part of the team's plans. "With Bartoli in top form," declared Mapei "Patron" Giorgio Squinzi, "the team would have won at least twelve more races, including 5 or 6 major ones. Bartoli is very important because he's a winner and a great tactician." The list of victories grew longer nonetheless, thanks to the "Old Lion", Johan Museeuw who left his mark on two races in his native Belgium, and Fred Rodriguez. The 26-year old Fred, who is Columbian by birth and America by adoption, won the Schaal Sels-Meksem race, also in Belgium. Rodriguez was also a winner on the other side of the pond in the Kingston-Port Hope stage of the Trans-Canada stage race. Mapei-Quick Step often races in North America. Fred was flanked by Rinaldo Nocentini, Leif Hoste, Axel Merckx, Paolo Fornaciari and Mauro Gerosa. Mauro, who raced in 1999 for Ceramiche Pagnoncelli, a Mapei Group satellite team, was making his professional trial debut.

Mapei-Quick Step participated in the Road Racing World Championship in Verona, Italy, on the circuit which featured the climb up the Torricelle, with Daniele Nardello, Andrea Tafi, and Gianni Faresin of the Italian national team, along with Johan Museeuw and Wilfried Peeters racing for Belgium, Pavel Tonkov for Russia, and Fred Rodriguez and Chann William McRae for the USA. Although they were involved in a fall in the prologue to the race, Nardello and Tafi continued strong. Cheered by 200,000 spectators and ignoring the pain, Tafi once again proved himself worthy of his fame as "The Gladiator", taking off out front 4 circuits before the finish with a 45" lead going up the Torricelle. Chann William McRae expertly maneuvered himself into position in the breakaway group with Freire, Zberg, Robin, Casagrande, Camenzind, Vandenbroucke, Ullrick and Konsyshev. Young McRae finished fifth and Freire became the new world champion.

Paolo Bettini ended the 1999 season on the upswing, classifying thirteenth in the International Cycling Union ranking. Paolo's performance was significant, considering that he is only 25 years old and will undoubtedly get even better as time goes on. When the right opportunity presents itself Bettini springs into action, even after racing 250 kilometers. His supersonic breakaways have a devastating effect on the group. Yet when someone needs help he's the first on the scene. Unfortunately he was drafted into the World Championships only to serve as a reserve rider. Without casting aspersions on the good faith of Antonio Fusi, head coach of the Italian national team, Bettini would have been a great asset to the team. Paolo was in excellent shape a week earlier when he won the first stage of the Tour of the Province of Lucca from Camaiore to Viareggio. He also triumphed in the general classification over many seasoned athletes, including Rebellin. Bettini also competed in the Milan to Turin race, his first victory after sitting out the World Championship, coming in second when



Swiss rider Marcus Zberg, second place winner of the World Championship, beat him in the final sprint. Moving at an average pace of 45.8 km. per hour for 202 km. under the rain and up the Superga Hill, Paolo was obviously in top form. Proving that a gladiator never gives up, Tafi threw himself into the fray. Winner this year of the Paris-Roubaix, Tafi broke away with Serpellini, Barbero, Michaelsen and Cattai and then beat them in the sprint. The last of Mapei's road race victories were won by Max Van Heeswijk in three stages of the Commonwealth Bank Classic.

MAPEI-QUICK STEP NUMBER ONE IN 1999

For the fifth consecutive year the Mapei-Quick Step Team is at the top of the International Cycling Union road racing final classification

(Updated to 30 Nov. 1999)

INTERNATIONAL CYCLING UNION TEAM CLASSIFICATION

	points
1. Mapei-Quick Step	8994
2. Rabobank	8750
3. Once-Deutsche Bank	5805
4. Polti	5697
5. Telekom Deutsche	5421
6. Mercatone Uno-Bianchi	5289

MAPEI - QUICK STEP 1999 VICTORIES

Total wins ('94, '95, '96, '97, '98, '99 seasons): n° 435

Updated to 11 Nov. 1999

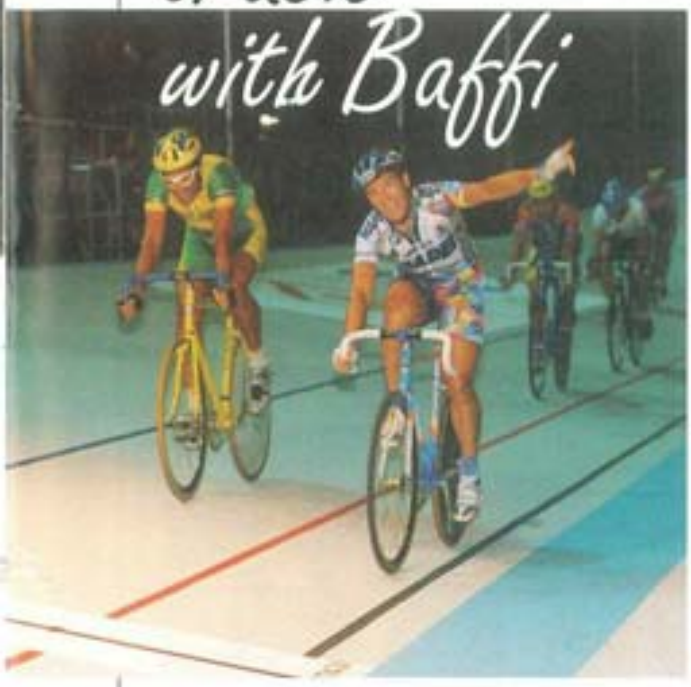
1999 Season:

- 27/1 BAFFI Final classification Six Days of Stuttgart (GER)
- 5/7 BAFFI Busto Garolfo stage/ Tour of Italy Track (ITA)
- 8/7 BAFFI Final classification Three Nights of Busto Garolfo (ITA)
- 11/7 BAFFI Final classification Three Days of Canavese (ITA)
- 16/7 BAFFI Italian Championships Point Race (ITA)
- 12/7 BAFFI Barletta stage/ Tour of Italy Track (ITA)
- 26/7 BAFFI Center stage / Tour of Italy Track (ITA)
- 16/8 BAFFI Porto Viro stage / Tour of Italy Track (ITA)
- 23/8 BAFFI Aquila stage / Tour of Italy Track (ITA)
- 13/9 BAFFI Pescantina stage / Tour of Italy Track (ITA)
- 27/9 BAFFI Milan stage / Tour of Italy Track (ITA)
- 27/9 BAFFI Final classification Tour of Italy Track (ITA)
- 2/11 BAFFI Six Days of Grenoble (SUI)

1) 3/2 RODRIGUEZ Langkawi Criterium / Tour of Langkawi (MAL)
2) 11/2 NOCENTINI Kuala Terengganu - Kota Bharu / T. of Langkawi (MAL)
3) 12/2 NOCENTINI Pasir Mas - Gerik / Tour of Langkawi (MAL)
4) 13/2 VAN HEESWIJK Miramas - Bèziers / Méditerranean Tour (FRA)
5) 14/2 LANFRANCHI Final classification Tour of Langkawi (MAL)
6) 14/2 STEELS Almeria - Almeria / Ruta del Sol (ESP)
7) 16/2 BARTOLI Benalmadena - Puente Genil / Ruta del Sol (ESP)
8) 18/2 STEELS Ubeda - Granada / Ruta del Sol (ESP)
9) 26/2 BARTOLI Tavernes de Valldigna - Calpe / Tour of Valencia (ESP)
10) 27/2 ZANINI Calpe - Benidorm / Tour of Valencia (ESP)
11) 3/3 BRAMATI Murcia - Cartagena / Tour of Murcia (ESP)
12) 7/3 PEETERS Ichtegem - Ichtegem / Omloop der Vlaamse Ardennen (BEL)
13) 7/3 PEETERS Classifica finale Omloop der Vlaamse Ardennen (BEL)
14) 13/3 BETTINI Luco dei Marsi - Paglieta / Tirreno - Adriatico (ITA)
15) 14/3 STEELS Nice - Nice / Paris - Nice (FRA)
16) 17/3 BARTOLI Final classification Tyrrhenian - Adriatic (ITA) – 400th win
17) 17/3 LANFRANCHI Faro - Evora / G.P. Portugal Telecom (POR)
18) 20/3 LANFRANCHI Final classification G.P. Portugal Telecom (POR)
19) 24/3 MUSEEUW Dwars door België Waregem (BEL)
20) 25/3 FIGUERAS L'Hospitalet de Llobregat - Cerdanyola / S. Catalana (E)
21) 28/3 BETTINI Montalcino – Roma / Cecchi Gori Memorial (ITA)
22) 28/3 BARTOLI Brabantse Pijl (BEL)
23) 30/3 STEELS Mouscron – Zottegem / Driedaagse van De Panne (BEL)
24) 4/4 VAN HEESWIJK G.P. de Rennes (FRA)
25) 6/4 FIGUERAS Toulouse – Zalla / Tour of the Basque County (ESP)
26) 7/4 STEELS Ghent – Wevelgem (BEL)
27) 11/4 TAFI Paris – Roubaix (FRA)
28) 14/4 BARTOLI La Flèche Wallonne (BEL)
29) 3/5 SCINTO Tour of Tuscany (ITA)
30) 5/5 FIGUERAS Geneva – Val de Travers / Tour of Romandie (SUI)
31) 8/6 TAFI Criterium Ponte a Cappiano – G.P. Mapei (ITA)
32) 5/7 STEELS Challans – St. Nazaire / Tour de France (FRA)
33) 6/7 STEELS Nantes – Laval / Tour de France (FRA)
34) 22/7 STEELS Mourenx – Bordeaux / Tour de France (FRA)
35) 29/7 FIGUERAS G.P. Rik Van Steenbergen (BEL)
36) 1/8 FIGUERAS Tueize – Dinant / Tour de la Région Wallonne (BEL)
37) 1/8 TONKOV G.P. Luk-Cup Bühl (GER)
38) 4/8 FIGUERAS Amay – Amay / Tour de la Région Wallonne (BEL)
39) 9/8 BETTINI Orense – Orense / Volta a Comunidade Galega (ESP)
40) 31/8 RODRIGUEZ Schaal Sels Merksem (BEL)
41) 4/9 MUSEEUW Omloop Mandel Leie Schelde (BEL)
42) 5/9 MUSEEUW Bavikhove Circuit(BEL)
43) 9/9 RODRIGUEZ Kingston-Port Hope / Trans Canada (CAN)
44) 16/9 NARDELLO Huesca – Pla de Beret / Tour of Spain (ESP)
45) 28/9 BETTINI Camaiore – Viareggio / Tour of Lucca (ITA)
46) 30/9 NARDELLO Paris – Bourges (FRA)
47) 1/10 BETTINI Final classification / Tour of Lucca (ITA)
48) 14/10 TAFI Tour of Piedmont (ITA)
49) 24/10 VAN HEESWIJK Commonwealth B. Classic / Newcastle Crit. (AUS)
50) 26/10 VAN HEESWIJK Common. B.C. / Nelson Bay – Bateau Bay (AUS)
51) 28/10 VAN HEESWIJK Common. Bank Class. / Centennial Park (AUS)

• Wins in: Italy, France, Belgium, Spain, Switzerland, Germany, Portugal, Malaysia, Canada

On the right track with Baffi



Adriano wins the final sprint of the National title.

Thanks to Adriano Baffi the Mapei Group's professional cycling team won the twelfth national title in its history. In the five years between 1994 and 1998 the building block team won 11 national titles for road racing including one individual time trial title: a record. However, Mapei had never won a national title for track racing until Baffi became Italian national champion in the point race at the velodrome in Dalmine, Italy. In addition to being a first for track-racing, the indefatigible Baffi brought home the Mapei-Quick Step team's first national championship title for 1999. Adriano beat Marco Villa and Olympic champion Andrea Collinelli in the final classification. In 1999 he also dominated the Tour of Italy track races, repeating his 1998 success with the final stage in the Vigorelli Velodrome in Milan, billed as "The Mapei Grand Prix". Adriano won 7 of the 8 stages of the Tour of Italy track races and wore the pink jersey at the final stage in Milan. With a total of 155 points he won out over Silvio Martinello (75) and Marco Villa (63).

Baffi is one of the best six-day racers in the world. In 1999 he triumphed in the Six Day Race in Stuttgart with Kappes and in the Six Day Race in Grenoble with Colinelli. He will undoubtedly go on to greater successes in the winter of 1999/2000.

Bettini on the moon in the year 2000?

Roberto Bettini, the much esteemed photographer of the Olympia news agency of Milan, Italy, is the winner of the 4th Mapei Trophy. The trophy is awarded to that member news media who predicts the most winners of the venerable super-prestige races, i.e. the World Cup Classics, the major stage races (the Tours of Italy, France and Spain), and the world championships of road and track racing. Bettini, who edged out Spanish journalist Chico Perez by 5 points, was also the 1998 winner, becoming the first photo-journalist to win the Mapei Trophy two years in a row. In the last races of the 1999 season, the World Championships and the Tour of Lombardy, he won out against tough competition represented by Sicilian journalist Filippo Mulè and the "Foreign Legion" composed of Chico Perez, Marek Ceglinski and Eric De Falleur. Born in 1960, like many great champions including Fignon, Delgado, Argentin, Franco Baresi, Maradona, Senna, Zenga, and Brheme, Bettini lives in Cuggiono, Italy, in the province of Milan, with his wife, Paola, and their sons, Luca (12) and Thomas (6). Daddy Bettini has achieved all the success a professional photographer could wish for. He's traveled the world over covering the cycling scene and got to photograph his favorite soccer team, Milan, in their Intercontinental Cup triumph. The prize accompanying the 1998 Mapei Trophy was a trip to Finland for Bettini and family including a visit to Santa Claus's house! He's already experienced all the earthly satisfactions a man could ask for. Will the moon be his destination of choice for the 1999 prize?

The photographer Roberto Bettini received from Miss Italy, Gloria Bellicchi, the award for the victory in the Prognostic International Mapei Trophy 1999. Also this year those in Journalism can participate in Mapei's Trophy. The results will be available on Internet (www.mapei.it). For further information call tel. +39.02.37673223 or send a fax (+39.02.37673214).

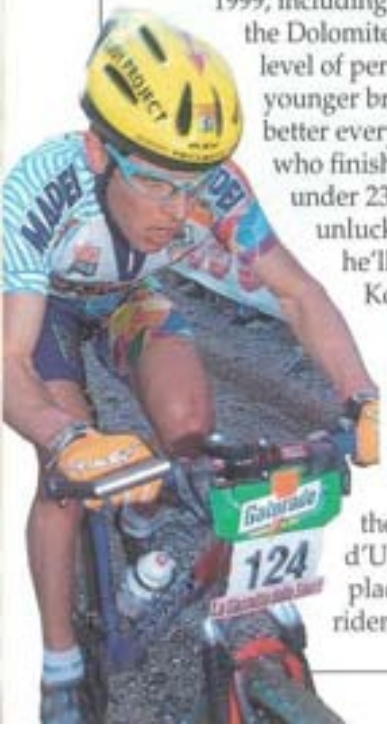
MAPEI TROPHY FINAL CLASIFICATION

NAME	PUBLICATION	POINTS
Roberto Bettini	Olympia	60
Chico Perez	Bicisport	55
Marek Ceglinski	Rzeczpospolita	53
De Falleur Eric	Gazzette des sports	52
Filippo Mulè	Giornale di Sicilia	52

MAPEI-KONA still queen of cross-country

2°	1°	3°
	11 Dario Cioni 7 Massimo Induni 5 Claudio Vandelli 3 Patriclk Cioni	
9	26	9

Riders who wear jerseys with the multicolored building blocks that are the unmistakable symbol of the Mapei Group don't only win races and set records in professional road racing. Mapei teams are winners who set new records even when they goe OFF the road. 1999 was a great year for the Mapei Kona Team that competes in all the major cross-country mountain bike races. Mapei Kona won 26 of them in the 1999 season. Once again 25 year old Dario Cioni was the team's star rider, winning11 races and setting his personal cross country season record. Dario triumphed in the Monte Naranco International Open in Spain, the Italian Winter Championships and the Speedylonga. Currently classified in the "elite" category, Dario will race professionally for the Mapei Quick Step Team in the year 2000. Massimo Induni ranked with the best of the mountain bikers in the Italian leagues, winning 7 competitions, including the Gatorade Cup. Claudio Vandelli, 1984 Los Angeles Olympics team time trials champion, won 5 races in 1999, including the Civetta Bike competition in the Dolomites with his usual outstanding level of performance. Patrick Cioni, Dario's younger brother, won 3 races, and gets better every year. Only Filippo Belloni, who finished second in the 1997 European under 23 championships, had an unlucky year. "But I have no doubt he'll bounce back," declares Mapei Kona president Gianna Meoni.



Mapei Kona's female team members also distinguished themselves, especially former swimming champion Silvia Panichi who made a promising cross country cycling debut. In the important international Salice d'Ulzio race Silvia took second place behind the great champion rider Paola Pezzo.

Mapei and Australia: a winning team

Mapei's choice of professional cycling as its main vehicle of communication facilitated entry into the pool of sponsors of the Australian National Cycling Team. The Australian riders, anxious to make a good showing on their home ground in the upcoming Sydney Olympics in the year 2000, made Italy their base of operations for pre-Olympic training, with their headquarters in Quarrata in Tuscany.

The Mapei name appears on the green and yellow jersey that the Australian riders wear in international team competitions and also on the green and yellow jersey with the white stripe they wear in the National Championships. Their pants feature the Mapei building blocks. Sheyne Bannan was the coordinator of the Italian tour.

Young Michael Rogers just missed winning the world title in the individual time trial in Treviso, Italy, coming in second behind the Spaniard Gutierrez. Rogers finished first in a preliminary World Cup time trial in Italy in 1999 and another in Australia. Nathan O'Neill was another Australian who performed well, finishing first in 4 races. O'Neill will be racing professionally in the year 2000 on an Italian team. Tom Leaper will also be making his pro debut with an Italian team in 2000.

Other race winners included Warren Jennings (2), Allan Davids, (2), Ben Godridge (2), Bruce Davidson (1), Cameron McDonalds (1), and Sean Sullivan (1). Daniel Trinne, Baden Cooke, and Matthew Wilson also competed in several road races. In addition to racing in various road events, Cadel Evans was also victorious in several mountain bike races, as was Luke Roberts in several track competitions.

THE RECORD "ARMADA" IS READY

Many define her as "the woman of lots of resources" others "armada", but one thing is sure, Mapei-Quick Step is the world's first lady. Since 1995 the team is first in the International Cycling Union classification. To date the team has 435 wins on road races. Being a specialist in records, the team starts 2000 with other records. The team is made up of 39 riders, representing 9 nations and are a total of 78 including technicians and personnel.

The team of the patron Giorgio Squinzi was presented at Mapei headquarters in Milan in viale Jenner. Among the technicians, Team Manager Patrick Lefevere (Belgium), the Directeurs Sportifs Marc Sergeant (Belgium), Fabrizio Fabbri and Serge Parsani were confirmed. The Spanish Jesus Suarez Cueva returns as Directeur Sportif, having been Directeur Sportif from 1994 to 1996 for the professionl team of the Mapei Group. A new entry for Mapei-Quick Step is Roberto Damiani as Directeur Sportif. Gabriele Sola is the team's Press Officer. Aldo Sassi is the coordinator of the Sport Service Mapei of Castellanza (Varese) where the team undergo evaluation and plan their training programs.

Above, from left, Oscar Freire, Giorgio Squinzi and Andrea Tafi

Left, Pavel Tonkov, Freire and Michele Bartoli

World Champion road race winner, Spanish Oscar Freire (class '76), is the main novelty of the team. "At the end of 1998," commented Giorgio Squinzi "we won the World Championship at Valkenburg with Camenzind, whose name is Oscar. We lost Camenzind because there was a reorganization of the team. Having lost Oscar, we immediately take on board another: Freire." The Spanishman from Torrelavega won the world title in his second year among professionals, a rare exploit.

Oscar is cut out for podiums. In 1997, Freire came second in the Under-23 World Championship in San Sebastian road racing. Freire is the fourth athlete to wear the rainbow jersey, in the history of Mapei Group professional team. Besides Camenzid, the others were Abraham Olano (first in '95 at Duitama) and Museeuw (in '96 in Lugano).

The American Chann Mc Rae ('71), is reconfirmed for 2000. He came fifth having just missed winning the World title. **Fred Rodriguez** ('73), is the other American man reconfirmed on the team and first in three races in '99. Besides Freire, the other great novelties are the 11 neo-professionals introduced in the team. Are the old timers abdicating?

"Absolutely not!" answers "The gladiator" Andrea Tafi. "My objective for the year 2000," continues Tafi, first in 3 races in '99, among which Paris-Roubaix, "is the Tour of Flanders." Michele Bartoli ('70), from Tuscany, who in '99 had to interrupt activity due to a fracture in the right knee-cap, is again ready to join the fray. Last year Michelino won 5 races of which a Walloon Arrow. Bartoli won 2 consecutive World Cups during his career, like the Belgian Johan Museeuw ('65), who is another "big" reconfirmed with Mapei-Quick Step. In '98, Museeuw broke his knee and in '99 went back to racing, with 3 successes.

The ferocious Belgian sprinter Tom Steels ('71), is again wearing the Mapei-Quick Step jersey. Since '96, the year he arrived on Squinzi's team, he has a total of 43 wins.

Stefano Zanini ('69; 1 win in '99), from Varese, the only Italian winner of the Amstel Gold Race up till know, and the Belgian Wilfried Peeters ('64; 2 wins) are ready to support Museeus and the other standard bearers of the classics.

In 2000, Paolo Bettini ('74), winner of 5 races in '99 will shine like quicksilver in Mapei-Quick Step. The year 2000 demands from the Dutch Max Van Heeswijk ('73), winner of 5 races last year, Giuliano Figueras ('76; 6 wins), Daniele Nardello ('72; 2 wins), and Rinaldo Nocentini ('77; 2 wins) to launch

in fabulous victories. The Russian **Pavel Tonkov** ('71), winner of the Giro d'Italia, will once again be the leader in stage races.

The tallest of the armada are **Paolo Fornaciari** ('71) and the Belgian **Axel Merckx** ('72) with the statuary height of 191 cm. Fornaciari is also the heaviest (80 kg). The shortest is **Gianni Faresin** (class '65), 168 cm. **Paolino Lanfranchi** ('68) and Bettini are the lightest, 58 kg. **Luca Scinto** ('68; 1 win), **Davide Bramati** ('68; 1 win), **David Tani** ('69), **Andrea Noè** ('69), the Belgians **Leif Hoste** ('77) and **Bart Leysen** ('69), the Spanish **Manuel Fernandez Gines** ('71) and **Manuel Beltran** ('71) complete the team.

Mapei-Quick Step 2000 new look

Beltran returns to Mapei-Quick Step.

Adriano Baffi ('62; 12 wins on track) is the oldest of the armada. Then there are Filippo Pozzato ('81; the youngest of the team) and the other neo-professionals.

In the auditorium, 4 models came down the cat walk in Mapei-Quick Step's new look for competition wear.

Of course the usual controversies on doping arose. "I am not happy with the measures taken by the International Cycling Union to stop doping," declares Dr. Squinzi. "There should be one single and strict regulation."

Numerous authorities from the International Cycling Union and Italian Cycling Federation took part in the press conference. Riders and VIPs then gathered in the Mapei show room to meet up with clients and fans. The show was directed by Alessandro Brambilla, official speaker of the World Championships and by Miss Italy '98, Gloria Bellicchi.

Bottom, large photo, Alessandro Brambilla and Gloria Bellicchi present the show in Mapei's show room in Milan.

In the small photos, some moments during the prize awarding.
From left, Freire, Bartoli, Steels, Fabbri, Tafi.

MAPEI-QUICK STEP AT THE DEBUTANTE'S BALL

"The young are our future". This is the core philosophy of Mapei-Quick Step's staff. The 11 neoprofessionals that make up the team are another record for Mapei-Quick Step. This is the first time in the history of the International Cycling Union that 31.4% of a team is made up of neoprofessionals.

Roberto Damiani is the Directeur Sportif that will direct the "debutante's ball". Damiani underlines, "in many occasions the young will make up the nucleus that will participate in important races. We are in no hurry because we have 39 riders and will not force them to run races that are for experts and athletically more mature. In order to increase their experience they will have to work hard, but without over straining."

Winner Filippo Pozzato is the baby of the team. When on January 1st "Pippo" arrived on the team he was just 18 years, three months and 22 days old. He descends from the junior category and has 74 wins on road races and about 50 on track. In 1997, still a pupil, he won the Italian title for road racing.
In 1998 he came second in the junior category World road race and third in chronometer and pursuit races. Last year he was nominated the Italian Champion in individual pursuit, team and individual chronometer races. "Many are scared to hear that he skipped the Under 23 category. We are making him skip the category to better safeguard him," says Damiani.

Among the babies of Mapei-Quick Step there is the Under 23 multi-winner of 1999 Luca Paolini from Brenna (class '77), with 12 titles. He came second in the World and European Championship of 1999.

Nicola Chesini from San Pietro in Cariano ('74), will try placing himself among the crowded finish line. He is a sprinter that won 10 races in '99. He comes from Pagnoncelli, one of Mapei-Quick Step's satellite teams. The Neapolitan sprinter from Brusciano Crescenzo D'Amore ('79) also comes from a satellite team, Grassi Mapei. Last year Crescenzo won 5 races and in '97 triumphed in the junior road race World Championship. In 1996 he was the Italian Champion for the kilometer sprint from a standstill point.

Dario Cioni ('74), lives in Empoli and this year will alternate between road racing and cross country mountain bike racing. In 1999 he won 11 races of which the Winter Italian Championship. Antonì Rizzi ('77) and Eddy Ratti ('77) are both from Retegno di Fombio in Lumbardy. In 1999 Rizzi had 5 successes and Ratti 3.

The Belgian Kevin Hulsmans ('78) is the man that in 1999 won the Under 23 Tour de Flanders and 8 other races. All this is great for Mapei-Quick Step, Queen of the classic races. Laszlo Bodrogi ('76) is Hungarian. In 1999 the rider from Budapest triumphed in 11 competitions and in 1997 came second in the Under 23 World Championships for chronometer racing. The Englishman from Manchester Charles Wegelius ('78), first in 5 races in 1999 and the Frenchman Philippe Koehler ('78) with 4 season successes, complete the multinational babies of the team. Koehler is from Strasbourg, will he bring Mapei-Quick Step to the European Parliament?

Enclosed with this edition you will find the calendar of all the races for the season 2000.

Six research scholarships

The first two of six scholarships have been awarded and two more will be announced shortly in a Mapei-sponsored research doctorate program with the Scuola Normale Superiore di Pisa.

An agreement was reached between Mapei and the Scuola Normale Superiore in Pisa, Italy to award two scholarships a year for three consecutive years. These scholarships will finance specialization programs for six chemistry and industrial chemistry graduates for research in the typical disciplines of the science of materials, such as the rheology of systems containing high concentrations of dispersed solids, the physical chemistry of interphases, adhesion phenomena, and the characteristics of composite materials, including wood composites. The first two scholarships valuing LIT. 26 million were awarded in January of 1999 to Michele Mader of Milan and Deborah Pinoci of Rome. The course involves a preparatory semester at the Scuola Normale Superiore, followed by the assignment of a research project pursued both at the university and in the Mapei research laboratories. The scholarship winners will be directed in their research by a university tutor and a Mapei tutor. The three-year program culminates in the examination for a Scuola Normale di Pisa diploma that is the equivalent of a doctorate in research.

MAPEI Borse di studio

"Corso di Perfezionamento in Scienze dei Materiali"

MAPEI

Announcement of scholarship competition

Mapei firmly believes that special post-graduate training is increasingly necessary to enable young people who work in technical capacities to contribute to product innovation. Developing new products requires interdisciplinary knowledge that combines a solid foundation in chemistry with knowledge of physical-chemistry, surface interaction phenomena, the behavior of materials under static and dynamic stresses, the rheology of heterogeneous systems, etc.
This is the very type of research that has enabled Mapei to develop new technologically advanced products that deliver consistently high performance even under the most adverse conditions.

Photo by Massimo Corsini

THEY SAID IT WAS IMPOSSIBLE...

with MAPEI it can be done

MAPEI