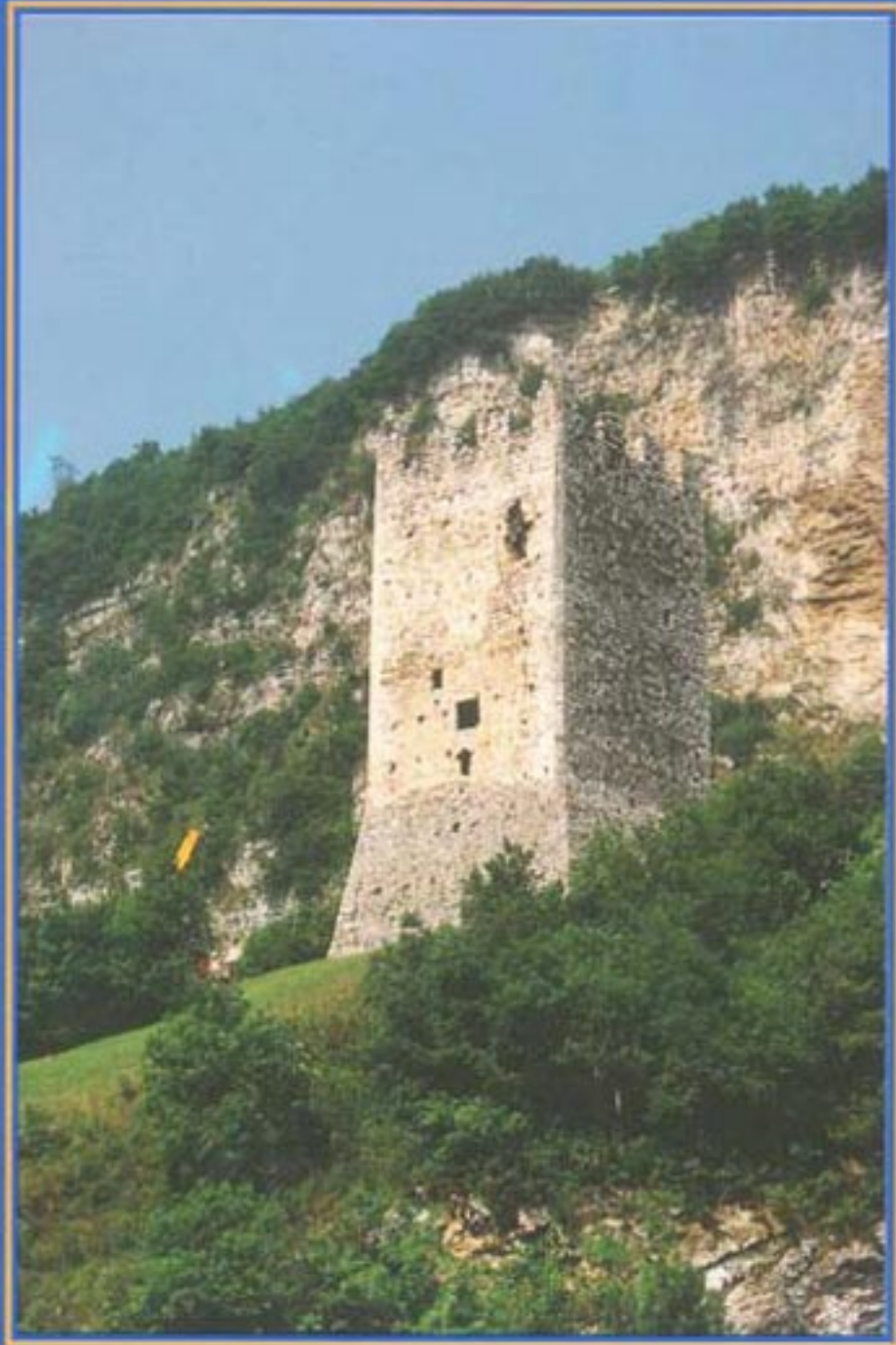


INTERNATIONAL

# REALTÁ MAPEI



1



## MAPEI THROUGH INTERNET

The next generation of the information age is here in the form of the Internet and the World Wide Web. Mapei leads here as well sites in Italy and the United States. Information about the company, its locations, products and even the MAPEI/GB professional cycling team is available 24 hours a day, worldwide. The U.S. site includes a hyper-link to the Italian site for up to the minute company and eyeing information.

Visit our sites on the Web at:

<http://web.MAPEI.com> or

<http://web.inferentia.it/MAPEI>

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Cover main photo: An image of the San Floriano Stronghold in Vittorio Veneto (TV-Italy)

### ERRATA CORRIGE

ON OUR PREVIOUS ISSUE OF REALTÀ MAPEI INTERNATIONAL WE INCLUDED A MISSTATEMENT AS TO THE COMPANY THAT INSTALLED THE RS GRANITE FLOOR AT THE NEW DENVER INTERNATIONAL AIRPORT. HEULER TILE INSTALLED OUR MAPECEM SCREED, NOT THE GRANITE. THE FLOOR WAS INSTALLED BY HEALY SOUTHWEST MARBLE & GRANITE SYSTEMS.



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THE BUILDING OF THE ISLAMIC CENTER IN ROME  
HAS BEEN AN IMPORTANT CULTURAL EVENT BESIDES BEING AN  
ARCHITECTURAL TRIUMPH.

# THE MOSQUE OF PORTOGHESI

by Renato Soffi

**T**he Blue Mosque is the most famous, but this new Mosque is destined to dim the beauty of the former one. The first stone was laid at the foot of Monte Antenne in Rome the 11th of December 1984, and in the end, 8 years were needed to complete the building. The time was required to overcome bureaucratic issues and to set up the sophisticated architectural solutions which allowed completion of the four impressive pillars and the astonishing domes.

## Extraordinary Execution

The structure of the Mosque relies on the complexity and wealth of materials employed. Advanced and special technologies have been developed in order to carry out the plan.

It is a fusion of two projects; one designed by the architect Paolo Portoghesi together with the engineer Vittorio Gigliotti, and the second designed by the architect Sami Mousawi.

To adapt to the value and prominence of the work, the task was to go beyond usual standards. Besides the employment of very specific material, many tests and quality control models were required.

The importance of the building made it advisable to build as if it was placed in a seismic area.

Therefore the edifice is divided into three principal sub-systems.

The Mosque consists of a superstructure (from the domes to the traffic floor), a geometric connection substructure (from traffic floor to the pillars' head), and the pillars-foundation ground set.





### **The Dome and The Biflexed Pillars**

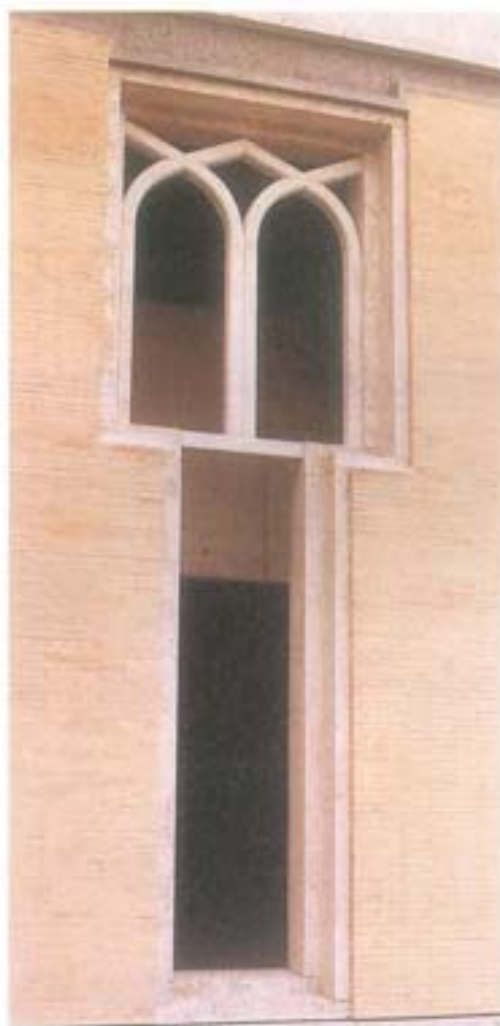
The most dramatic part of the Mosque are the domes, supported by 32 biflexed pillars and by Mirab walls.

The large central cupola, built on a ring-like girder, measures 11.40 m radius and it is surrounded by 16 perimeter domes and 4 semi-domes. The structure is supported by pillars with four stalks which form the capital.

### **Quality and Durability of the Concrete**

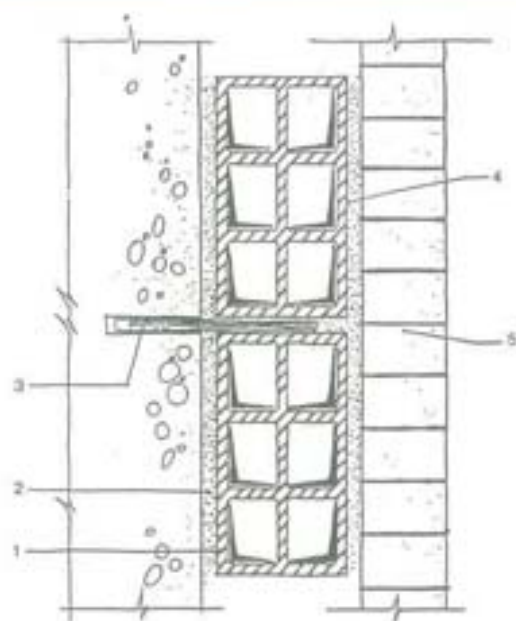
The basic structure of the Mosque was made using a "warm white" concrete, obtained from mixing two differently colored Tevere sands. Special care was devoted to the durability of concrete, insured by setting, laying, curing and galvanizing the reinforcements. A further important precaution was to subject prefabricated elements to accelerated curing. A special fiberglass reinforced concrete forms the women's gallery while the central dome is constructed of light-weight concrete which allows for a 25% reduction in weight.





**Roman Curtain**

As far as the finishing was concerned, the exterior walls have been built with the Roman Curtain technique. This consists of handmade bricks and regular connection joints with a thickness of approximately 1 mm. This latter is a special technique recovering the one architect Borromini used in Rome during the 17th Century. Besides the architectural and aesthetical suggestion, derived from curtains attached directly to continuous concrete walls, the project granted stability in case of seismic movement. Such needs made it necessary to adopt a unique constructive system (as shown in the drawing above).



- 1.Hollow brick
- 2.KERABOND + ISOLASTIC\*
- 3.Insert of stainless steel
- 4.Binder
- Roman brick. A special mortar with a tear resistance of 10 Kg/mq
- 5.KERABOND + ISOLASTIC\* allows good bonding between the curtain wall and the bricks: the good flexibility of this system is able to absorb either the movements of the structure or the possible vibrations caused by earthquakes

**The Choice of the Adhesive**

The bricks of the facade have been laid with KERABOND adhesive modified with ISOLASTIC liquid (KERALASTIC system in North America).

On the basis of core boring proofs and thaw-freeze cycles, such bonding proved to be elastic and suitable to absorb movement from brick and temperature changes. Following the directions of the architect Paolo Portoghesi, the admixture has been combined with KERABOND

*\*KERALASTIC SYSTEM in North America*





On the right professor Paolo Portoghesi whose interview is published on the next page. Below engineer Luciano Palozzi, jobsite supervisor



white and KERABOND grey powder. This choice is not only due to the need of bonding the brick but to achieve the proper coloring of the joints to match the old mortars. The same system is employed for bonding the brick to the floor screed.



The technical data sheets for the products mentioned in this article are contained in Mapei binder No. 1 "Setting Materials for Ceramic Tile and Natural Stone"



#### TECHNICAL DATA

**PROJECT:** Mosque and Islamic Cultural Centre in Rome, Italy

**DESIGNERS:** Prof. Paolo Portoghesi, Eng. Vittorio Gigliotti and Arch. Sami Mousawi

**CONSTRUCTION SUPERVISOR:** Prof. Paolo Portoghesi and Eng. Vittorio Gigliotti

**JOB SITE SUPERVISOR:** Eng. Luciano Palozzi

**TECHNICAL SUPERVISOR:** Eng. Giorgio Flumeri

**CONTRACTOR:** Eng. Fortunato Federici - Rome

#### STRUCTURAL PARTS:

- Prof. Eng. Emanuele Filiberto Radogna: advice and coordination of the projects' reinforced concrete, prefab parts and cast-in-place concrete
- Prof. Renato Turriziani: preparation and cast design of the concrete with white and normal cement
- S.G.S., geotechnics center of Dott. Eng. Carlo Cassinis: foundations and materials test
- Studio Tecnico C.F.R., Eng. Alessandro Ressa, Eng. Pasquale Cocomello, Arch. Gian Luigi Tocchini Valentini: execution of the projects reinforced concrete, prefab parts and cast-in-place concrete



## INTERVIEW WITH PAOLO PORTOGHESI



**To what extent was the importance of the finishing materials, especially the exterior ones in your project for the Mosque of Rome?**

One of the main tasks in projecting the Mosque was to build a lasting edifice that was going to require little effort for its maintenance. The purchaser required the building to endure at least 1000 years. Therefore the choice of the materials had to be very careful. Several technical devices were set in the structures.

And what was more important was that the external cement had to be protected from the atmosphere through the use of nosings suitable to shelter the tree-shaped large pillars surrounding the Mosque. These latter consist of four prefabricated elements held together by a subsequent concrete cast. Obtaining such a pollution-resistant building was achieved by pulling back the pillars in comparison to the roof, which is composed of travertine, a material highly resistant to atmospheric agents.

**The Roman Curtain has ancient origins. From a technical standpoint, how did you succeed in achieving an antique look with the required modern quality and durability?**

The Roman Curtain (the ancient opus testaceum) was originally built with cut tiles, which used to be smoothed to obtain leveled

surfaces eliminating the irregular shapes caused by baking the clay in an oven.

This system, which was widely used in the past, was revived during the Renaissance. The characteristic of this finishing is that the joints between the bricks measure less than one millimeter. To rebuild this ancient technology we consulted the specifications of Borromini's works.

Through modern means we created the conditions to attain the same tile performances, which in our case was obtained by slicing a brick. Afterwards we faced the problem of forming thin joints while achieving a stable link between the brick covering and the wall surface behind. We solved it using Mapei adhesives, high ageing-resistant material, able to produce the thin joint required in the project.

**Were the exterior and interior runs an important detail of the project? Which materials were employed and what was their aesthetic and technical task?**

The exterior and the interior runs are certainly one of the fundamental elements of the project, which in the first place aims to become a "running architecture".

Being a part of town, the building is marked by the same characteristics of the religious constructions (in particular the persian ones), which are never

isolated but always connected to rooms where teaching and law exercise were practiced.

This shows the deep tie between culture and religion, a typical mark of Islamic civilizations.

Being a "running architecture" the visitors are continuously stimulated by sight variations, optical effects accomplished by using different colors at the same time.

The result is created by matching textures, color shades and harmonic shapes that follow the visiting public along the whole route, or routes, of the building.

**As the construction supervisor you paid attention to the installation of the finishing materials.**

**How was your relationship with the installers?**

Together with engineer Vittorio Gigliotti I played the role of construction supervisor strictly checking the installation through incessant visits to the construction site. This allowed me to have the fascinating experience of observing skilled labor forces at work. It has been very interesting to see the installers build the opus testaceum wall covering; gaining each day more and more experience. As a matter of fact if you walk around the building you can notice which ones are the parts erected at the beginning.

They still show little defects in comparison with the recent sections, which are the result of the self-confidence and experience of the workers.

This might represent a significant note, since the Mosque of Rome was, as every work of art, a training place where the workers themselves learned something they will not forget in the future.



## RESTORATIONS

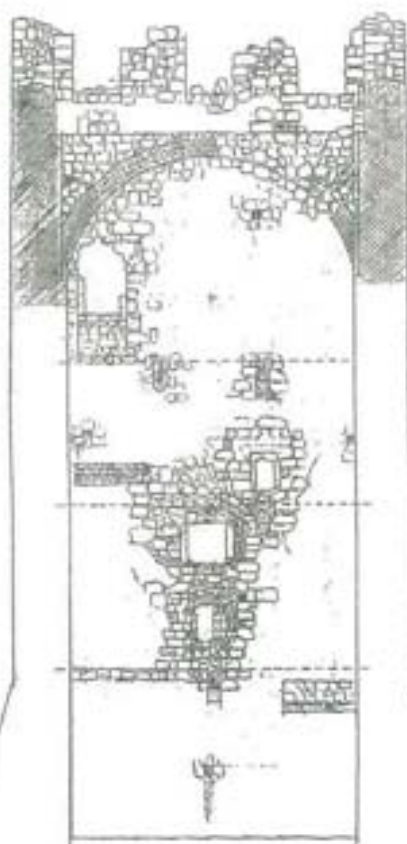
INSIDE THIS ANCIENT DEFENSE FORTRESS THE DECAY OF THE LIME-BASED BONDING NEEDED RESISTANT BUT DELICATE "SCIENTIFIC" PRODUCTS. ONLY IN THIS WAY COULD THE TOWER RETURN TO ITS ORIGINAL SPLendor.

by Paolo Alberti

# THE SAN FLORIANO STRONGHOLD

At right, lithological test of the eastern side of the tower were conducted by dr. Pierfrancesco Comis to establish the right intervention.

Below, an outlook of the eastern side of the tower during the intervention with few products from the line MAPE-ANTIQUE



The stretch of the Alemagna road connecting Vittorio Veneto to Fadalto (a Venetian valley) is ideal to be driven on a journey back in time. For years the Venetians seeking one's fortune covered this road which runs from Eastern Venetia to Austria and Germany. Before those times the Venetians from the Serenissima Republic used to collect tolls for goods and people in transit. The San Floriano Stronghold, lapped from this ancient route and from the new highway, is characterized by a rich history tracing back to very early times, before the Romans, then the Goths, the Longobards and eventually the Franks built up a set of fortifications to defend the whole valley. The San Floriano Stronghold belonged to this defense system being the lookout post, the sanitary inspection and the toll collection control point. In this tower, placed on a rocky spur (exactly over the fault often causing earthquakes), in 1992 Mapei carried out a restoration with MAPE-ANTIQUE for the repair and recovery of the ancient masonry. The customer, Vittorio Veneto municipality, after executing several static and analytic checks of the stones and mortars constituting the tower, found it imperative to use products and systems specifically designed for historic renovation.

- continued on the next page



The technical data sheets for the products mentioned in this article are contained in Mapei binder No. 3 "Building Specialty Line"



## RESTORATIONS



*From top to bottom page: the southern side of the tower with the new highway to Vittorio Veneto, in the background; the former undertaking of restoring with cementitious products totally cracked; view of the southern side with the degraded and inconsistent thick-bed mortar*

### Consolidating and Curing

Before the restoration, Mapei conducted an analysis of the exact composition of the aggregates and of the different bonding materials used throughout the centuries. It was necessary to draw mortar samples to be analyzed at the Mapei laboratories in cooperation with professor Collepari of the Enco company. The analysis showed that the mortars utilized in bonding the stones has a certain quantity of sulphates. The use of normal cement-based mortars would have provoked negative results. The specifications lead to the choice of MAPE-ANTIQUÉ since it is able to provide low flexibility modulus, shrinkage control, and no reaction to sulphates.



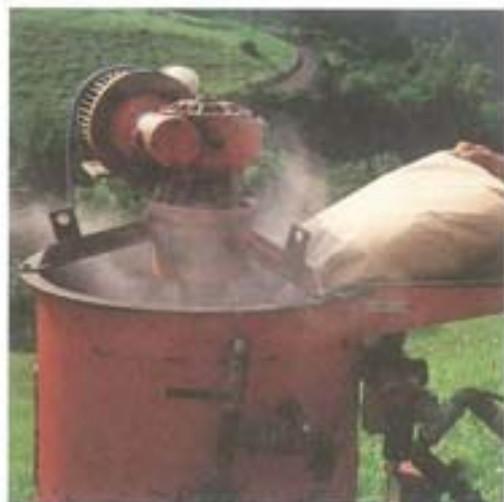
There were two stages of renovation; sealing the stones with MAPE-ANTIQUÉ MC, a mortar designed for historic buildings, followed by the consolidation, with injections of MAPE-ANTIQUÉ I, a binder also designed for historical building masonry.

### Conclusions

Consolidating has only been the first step towards the restoration of the Stonghold, which will no longer be a ruin but a fascinating building open to the public. The architecture of the Stonghold is suitable for transformation into a museum displaying medieval techniques for defense and construction.



## RESTORATIONS



*On the left, preparation of the MAPE-ANTIQUE I slurry bond coat directly in the special injection pump; executing the consolidating injections with MAPE-ANTIQUE I; detail of the hole after the injection. Below, the tower is ready for a new use.*

The renovation, totaling U.S. \$470,000, provided a complete restoration of the 18 meter high roman tower. Thanks to the financing of several companies, Mapei was also able to restore the entrance floor, build transparent roofing, and renovate the drawbridge.

### TECHNICAL DATA

**Project:** San Floriano Stronghold, Vittorio Veneto (TV), Italy

**Year of construction:** 15th century, on roman ruins

**Year of the restoration:** 1992

**Design:** Prof. Arch. Guido Zordan of the University of Venice

**Construction supervisor:** Eng. Giuseppe De Vido, Vittorio Veneto Municipality

**Contractor:** Brenelli di Porcia (Pn)



THE LAST TEN KILOMETERS OF THE HIGHWAY RUNNING BY GENEVE FINALLY JOIN THE NORTH SEA WITH THE MEDITERRANEAN CONCLUDING AN AMBITIOUS PROJECT WHERE MATERIALS PLAYED A CHALLENGING ROLE.

# ECOLOGICAL TUNNELS

by F. Stronati, A. Falco, J.P. Maillard



Thanks to perfect harmony with the landscape, to sound-deadening barriers and to safe-driving devices, the highway running by Geneve can be properly called ecological.

This attribute was also underlined by the opening, which took place last June 26. As a matter of fact the first to cross the asphalt were the runners and cyclists of the

PHOTO 1



PHOTO 1 The drawing shows the Swiss, French and Italian highway network and highlights the Genevian highway stretch, recently completed

PHOTO 2 The image of a tunnel at the end of the works

PHOTO 3 The opening of the RN1A highway in Geneve



Peri-feerique contest. The project was ecological but also expensive. Each kilometer of the so called "millionaire speedway" totaled \$88,000,000. The last strips open sky tracts of the highway (8.9 km), connecting Switzerland to France, were enriched with some 155,000 trees and 140,000 shrubs planted on 300,000 square meters of surface. To easily cross the mountains two tunnels (Vernier and Confignon) were built. Particular care was devoted to the design and building of the tunnels: crossing them is actually the most interesting part of the entire project.

## An Exceptional Vault

The millionaire speedway was covered with an exceptional vault to cope with the "tunnel effect", that is to say the drowsiness caused by the monotony of the RC walls of the tunnels. Some 3750 square meters were covered with porcelain tiles up to 3 m high, creating rich and colored mosaics. The artistic pattern of the Vernier Tunnel was designed by Claude Duprez. The color

Technical data sheets for the products mentioned in this article are contained in Mapei binder No. 1 "Setting Materials for Ceramic Tile and Natural Stone" and No. 3 "Building Specialty Line"



PHOTO 5 Application of GRANIRAPID on a cast concrete support

PHOTO 6 Tile back-buttering with the adhesive

PHOTO 7 Laying the ceramic wallcovering





PHOTO 3



PHOTO 4

One of the mosaics set inside the Vernier tunnel representing the panorama of the city of Geneva

shades from dark to light tones while driving from north to south. Midway, seven mosaics showing the most beautiful sights of Geneva were composed on a side wall. Inside the Chevres tunnel the design of the walls are by Paul Viaccoz. On one side there are drawings forming the word arc-en-ciel with the colors of the rainbow; on the other side the artist employed the Braille stud writing to form 40 patterns quoting Baudelaire: Aveugles, ils traversent ainsi le noir illimité (The blind, they may pass through the infinite black, tr.). Inside the Confignon Tunnel (1450 meters length) the drawing of the surface covering was

PHOTO 4



PHOTO 5



PHOTO 6



PHOTO 7



entrusted to Aldo Guarnera. In one sector two persons meeting, while in another sector the same people are parting.

### The Importance of the Surface Covering

In the past the protection of concrete was obtained by using a special light colored paint. On this project the director, architect Jean-Bernard Varone, ruler of the Atelier d'architecture et d'urbanisme AVV of Geneva, chose ceramic in place of paint, by saying: "It is an innovation for French Switzerland, but not for the whole country since it was already successfully adopted, for example in the Uri Gallery. We mostly used this technique because of its durability and strength compared to paint, which usually needs an application every ten years. On the contrary, ceramic grants protection for at least 50 years". "We laid Timaker unglazed porcelain tile by Mirage," explained Jean Pierre Maillard, director of Getaz-Romangs ceramic division, "but treated as they were set on a facade." The tests confirmed, for example, low water absorbent-capacity (0.01%). The role played by installation materials and by the supervision of construction, overseen by the Science of Materials faculty of Lausanne, was very important. They chose Mapei's materials because of the physical-chemical performances required in the

PHOTO 8



PHOTO 9



**PHOTO 8**  
A stage of the porcelain tile installation inside the Vernier tunnel: one of the mosaics is being set

**PHOTO 9**  
Grouting tiles with KERACOLOR + FUGOLASTIC\*

\*FUGOLASTIC is named PLASTIJOINTS in the North American market)

project and its capacity to guarantee, over time, the adhesion of the covering.

Porcelain tiles in conjunction with the setting materials form a covering with the following performances:

- resistance to petrol pollution
- polish from dust and dirt through abrasive brushes and water steam
- unalterable colors over time
- well-sheltered concrete
- lack of dangerous fumes in case of fire
- resistance to thaw-freeze cycles and to crazed concrete.

#### Setting Method

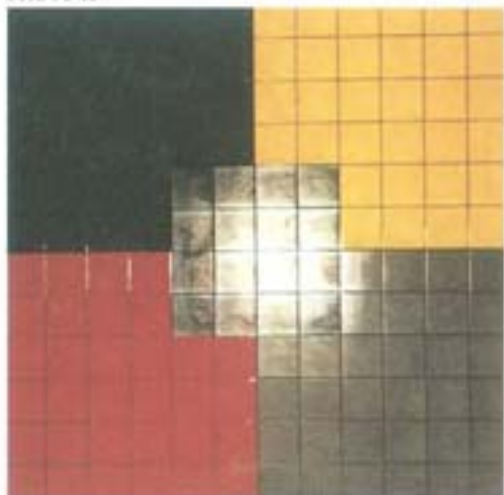
Let's sum up the course of the work:

1) The concrete surface of the tunnel was scarified through hydro-jet to remove possible traces of form release agents and make it rough to strengthen the adhesives bonding capacity.

2) Only where it was necessary the surfaces were leveled using NIVORAPID, shrinkage-compensated ultra-fast setting thixotropic cement leveling mortar.

3) Waterproof cement mortar resistant to attack by chlorides and sulphates. Such procedures also protected concrete from possible de-icing salt penetrations piercing through tile joints at the entrance of the tunnels. At the base of the vault the reinforced cement sections were covered

PHOTO 10



up to 60 cm high, whereas the rest was protected to 10 cm. MAPELASTIC was then used for sheltering the expansion joints and the new-on-old concrete vaults.

4) Tiles were set using GRANIRAPID, a two-component fast-setting cementitious adhesive with rapid hydration.

The supervision of construction approved of this product only after verifying, through tear resistance tests, a bonding strength of 29kg/cm<sup>2</sup> and a flexibility fit for supporting the vibrations caused by heavy traffic. During the tests the adhesive was applied with the double-coat technique, in

PHOTO 11



**PHOTO 10**  
A detail of the wallcovering in the Chevres trench

**PHOTO 11**  
Detail of the expansion joint filled with MAPELASTIC



PHOTO 12



PHOTO 13



PHOTO 12 and 13  
The entrance of the  
two tunnels at an  
initial stage and once  
finished

compliance with the regulations in force. The notched trowels were shaped in order to ensure the complete wetting of the back of the tiles, otherwise impossible to obtain, considering the arch of the vault. GRANIRAPID proved to be a profitable choice since during the work the temperatures inside the tunnels were comparatively low. Its fast-setting characteristics allowed installation within the required time period.

5) Tiles were set with large joints to match the expansion joints treated with MAPELASTIC.

6) Grouting was executed using KERACOLOR large grain mixed with FUGOLASTIC (named PLASTIJENTS in North America). This is a cementitious grout modified with a latex able to make the joints waterproof, flexible and mechanically sound. Choosing such products was necessary to obtain a grouting particularly resistant to future maintenance operations, such as frequent water jet cleanings.

#### Perfect Bonding

More than 80 installers (gathered in a society and coordinated by Baur C+G from Geneva), were divided into groups of four people, and worked for two months

setting 440,000 tiles, at a rate of 1000 square meter surface a day. The work inside the tunnels started in February 1995, and has been periodically overseen by Mapei Technical Assistance. The Mapei team proceeded with a systematic and probing check on the setting quality, providing an authoritative support during the application stage of the project. At the conclusion of the project, in June 1995, technicians verified the bonding capacity of GRANIRAPID to concrete. Bond tests, directly performed on tiled surfaces, recorded rates higher than 30 kg/cm<sup>2</sup>. Undeniable results were obtained thanks to the faultless union between planners, technicians, installers and material manufacturers. Always in search of solutions to insure ceramic and natural stone projects last for many decades.

#### TECHNICAL DATA

**Project:** RN1A highway tunnel by Geneve, Switzerland

**Contractor:** Ministry of Works, Engineering Department of Geneve

**Wallcovering designers:** Jean-Bernard Varone of the Architecture and Town-planning Office AVV in Geneve

**Material supplier:** Jean-Pierre Maillard, Director of Getaz-Romang ceramic, stone and marble sector

**Tile Installers:** A union coordinated by Baur C+G of Geneve

**Year of construction:** 1981/1993

**Year of wallcovering installation:** 1993

**Ceramic wallcovering:** 30x30 unglazed porcelain tile "Timaker" by Mirage

DOMINIQUE PETROD, GENERAL MANAGER OF OUR FRENCH AFFILIATE, TELLS HOW MAPEI IS TAKING ADVANTAGE OF MARKET OPPORTUNITIES FOR ADHESIVES AND CONSTRUCTION PRODUCTS IN FRANCE AND NORTHERN EUROPE.

## MAPEI FRANCE DOUBLES



**W**ith two new plants, the christening took place July 1994, Mapei France is gearing up for a challenging year. Even if economic circumstances are not the rosier, many projects are in the pipeline. First, a new production facility was inaugurated in a strategic part of northern France near Paris. Second, a secret ambition, to beat the production record of the St. Alban plant near Toulouse, which has been working at such full steam since its opening in 1989 that it has already had to expand several times (there are about forty employees by now). We asked Dominique Petrod, manager of MAPEI FRANCE, to bring us up to date.

Because on one hand, is strategically positioned for northern France and the Benelux countries. On the other, so it can take advantage of an already existing unit producing sand (Ste. Sifrac); this enables us to produce mortars and adhesives at a very reasonable price.

**Has the addition of this plant changed Mapei France overall strategy? And what about sales strategy?**

This was already part of Mapei's strategy for France since 1988, the goal being better coverage of the domestic market and development of the export market to Great



*On the left, the Toulouse plant, the original headquarters, and Dominique Petrod, General Manager of Mapei France, who explains the strategies of our French affiliate and describes the two plants*

**Tell us about the new plant.**

The Montgru plant northeast of Paris occupies a covered area of 5,500 square meters on a total area of 25,000 square meters. There are about twenty employees. Don't be surprised that the number of employees is so small, every facet of the operation is completely automated.

**Can you describe what types of adhesives are produced and the production capacity?**

At first the plant will produce most of Mapei's powdered products with a capacity of approximately 200 tons a day.

**Why was the Montgru site chosen?**

Britain and in part to Spain as well.

**Has the Toulouse plant ended up taking a back seat?**

Certainly not. It remained the Mapei France headquarters and the principal production unit. Since the year it was founded in 1989, St. Alban has been subject to constant innovation, which has brought us up to a record daily production of 350 tons. At Toulouse we produce the entire range of Mapei products, whereas Montgru produces only powdered products and is only a distribution point for paste products.

**Is Mapei production in France different from what it is in other countries?**







### Italy, for example?

No, because every product meets quality standards determined by laws in effect for all of Europe. However some differences may be found in packaging, which contain particular indications for each country.

### Has the sales network undergone any changes?

No, aside from increasing the number of salespeople for northern France.



*The photos on this page show the various stages of construction. In the large photo the new Montgru plant, completed in record time. From laying the corner-stone to becoming operational in six months!*



### What is Mapei France position in the French market for products for installing ceramic tiles, wood, resilient flooring and carpet?

Since 1988 Mapei France has seen steady growth in adhesives, both ceramic tile adhesives as well as those for resilience and carpet. Nevertheless, our most significant presence is in ceramic tiles, which constitutes 80% of our volume.

### How important is the building products line?

Although there is a considerable market for these products, this is still a small part of Mapei's business. To open up the market substantially for these Mapei products, we have to obtain certification from standard boards, and create technical/sales structures tailored to this particular area. We foresee achieving this in a relatively short time.

### Is the renovation market important in France?

I would say definitely yes. It represents more than 50% of the construction market.

### How is the construction market?

In 1995 we had a certain increase in the demand for construction, spread evenly throughout France, even if its level is still low.

### And what about the economy in general?

Economic indicators predict an improvement in the economy but only in the long run. As a matter of fact the high unemployment rate in France favors savings and restricts consumption.

### And the outlook for Mapei?

Excellent. That is why we are expanding. Our quality products and reasonable products are well served for this economy. We look forward to another year of growth.

# THE INFORMATION ERA

HOW DO YOU KEEP UPDATED? THE DATA PROCESSING REVOLUTION HELPS DESIGNERS AND INSTALLERS, ALTHOUGH NOT ALWAYS SUFFICIENTLY

by Sergio Mammi

Top right, "Information is half the battle" is the slogan we trust in. Below, the marketing supports for the Ultracolor advertising campaign



Here is the reply of the industry, which is frequently on your side. The *Information Era* as described by J. Naisbitt in his famous book "Megatrends" has created a worldwide revolution with the introduction of data processing advances and telecommunications which strongly characterize our age. This era is equivalent to the Industrial Revolution during the first

half of the century which relieved man of physical stress on the job. The *Information Era* will replace man's intellectual activity.

We are hoping this is not going to lead us to decline, but instead will free us to concentrate on new directions. In order



Information is half the battle.

Men-at-Arms



The world's bestselling series on military history and warfare from the ancients to today's fighting men.

OSPREY

for this to occur it will be necessary for people to be "trained" with a new approach. Our countries' data processing systems are laboriously moving in the right direction despite not being fully aware of the significance of the change. Far behind the times seem to be the official data processing systems, which should ensure a constant flow of information to adequately prepare people. Training is what allows people to achieve the basic *interface* to collect and comprehend information. The professionals are the ones who are most directly involved in the new revolution. As they are most often collectors and spreaders of information. As this relates to our industry, many engineers and architects have learned essential designing skills through education and subsequent training. Those who are not constantly acquiring new information, soon become non-competitive and out-of-date.

## How Can You Be Competitive?

Who should our industry's professionals contact for information to keep updated? Information seems more and more specialized, requiring a wider range of training. The risk is to become a jack of all trades, master of non. In the Middle Ages and in the Renaissance, "guilds" were used to promote the training of the workers. New information was scarce and the development was slow as compared to present times. Even today institutions are incapable of complying with the ordinary requests for updating. Each professional (surveyor, engineer, installer, plumber ...) is often forced to set up his own "data processing system", which is very time consuming to prepare and maintain; and many times incomplete.

## A French System

A few years ago at ISM





*At right few videos of Mapei products. Below, a flash of Mapei's workshops, conducted all over Italy*

(Institute Superieur du Marketing in Paris) a professor described what he thought was an excellent professional data processing system: since each of us generates and collects information, we can make a list of



*Above, Pasquale Zaffaroni, one of the speakers, during the meeting on the restoration of historical and modern buildings, held with designers coming from each corner of Italy*

personal contacts for selected information. Collecting books, magazines, and articles is certainly a good system, but the day you need something you will not be able to find it, and setting up and maintaining an active archive is costly and time consuming. Data processing banks are useful but are expensive, incomplete and difficult to use.

#### **Industry and Information**

Some manufacturers set up information systems which are effective and more useful for the professional. Their programs are constantly updated through traveling courses, workshops and technical assistance. A good example of a diffusely operating data processing system is the one Mapei has created. Useful technical information is contained in our magazine *Realta' Mapei* (Italian version) and *Realta' Mapei International* (English version). For further clarification or information discussed

in the various articles you can always contact your local Mapei Technical Assistant, who can provide more details and suggestions.

#### **The "Traveling Workshops"**

The most specialized level of training is the "traveling workshops". Mapei conducts many on a variety of topics where you can benefit from the experience and knowledge of our highly specialized technicians. Almost everyday we receive questions involving the restoration of both ancient and modern structures. Thanks to both the extraordinary support of Professor Mario Collepari and complete technical documentation, it is possible to hold conferences which deal with these restorations in detail. Such workshops are usually held for different audiences - one specifically designed for public or private contractors and designer, and the other for professionals and installers. Twenty to thirty workshops are held annually. Each aspect is important to the success of a project. Which is why Mapei covers specific information at a variety of levels, from retailers to installers.

*Please contact your local Mapei representative for a schedule of workshops which are currently available.*



**SERGIO MAMMI**

Since receiving his degree in mechanical engineering, he has worked at important companies dealing with heat insulation. Since 1982 he practises the free profession. He has been general supervisor of CTI (Italian Heat Technology Committee) and is currently general manager of ANIT, the National Heat and Soundproofing Insulation Association, organizing series of workshops and meetings.

Safety is a real challenge for adhesive manufacturers from all over the world called to action. The workers are taking on the challenge and becoming more responsible in requiring detailed "safety data sheets" to be carefully examined as a rule before and not after the use of a product.

by R. Leoni e P. Murelli

## TOTAL SAFETY: GOAL OF THE NINETIES

Protecting the environment from pollution coming from either inside or outside the firm, together with consideration for on the job safety and health are everyday subjects on work sites around the world.

Today many worldwide companies are formulating and applying laws and standards concerning products and their effect on the environment and health. In addition to these official set of norms, the manufacturing associations are adopting voluntary actions to establish guidelines to become environmentally friendly.

A few years ago Federchimica, the national federation of chemical industry, launched the "Responsible Care" program.

The aim is to directly induce each single firm to control the environmental effects of

product not have a foul smell.

Thus forgetting that among the perils of chemicals, bad odor is often the last and least important of health considerations. The scarce sensitivity of workers to their own safety and to the environmental safety compels manufacturers to develop a company's strategy that is able to reduce to a minimum the rate of hazards for the customers. Mapei has always devoted much care to problems related to safety and guarding the environment, using step by step instructions ranging from the projection of the product up to the final assistance to the applicant.

### Research

Research carried out a determining role in the development of "safe" products.



their production facilities, as well as encouraging tradesmen to work safely while helping them to manage such problems through agreed regulations. Notwithstanding the legislative and manufacturing ferment, in the specific field of products for laying floors, laws regulating the use of dangerous materials do not yet exist, except for the general ones about chemicals.

On their side the users are insufficiently receptive to problems dealing with safety devices. Before starting to work the installer very often inquires about the most proper product to be used for a specific application, the exact appliance and the final cost. Very seldom does the user consider the possible product hazards and the necessary precautions for safe use. The only feature usually required is that the

Mapei R&D laboratories work at full steam since 1937.

### Removal and Replacement of Dangerous Substances

Over the last years scientific progress, in the field of medicine in particular, has brought to light the extreme environment and health hazard of a large number of chemicals.

Unfortunately, in the past, some of these substances were very common in installing products.

Now, thanks to intense and accurate laboratory research, they can be eliminated and replaced with safer raw materials.

The indicted substances are as follows: asbestos, formaldehyde, methanol,

*Few international-recognized marks indicating the major health warnings and advisories in the products' use*





*The flame is the heart of the atomic spectrophotometer which measures the plasma emission release. It is useful to establish the quantity of metals or hazardous elements embodied in the products*

*A fibre of asbestos: you can notice the needle-shaped configuration responsible for damages to lung tissues which can turn into cancer. A synthetic fiber with its typically smooth shape. These pictures were taken in the Mapei laboratories using the Philips Sem XL20 scanning electron microscope. The fibres are magnified 1550 times*

pentachlorophenol and its salts, and organic solvents in general.

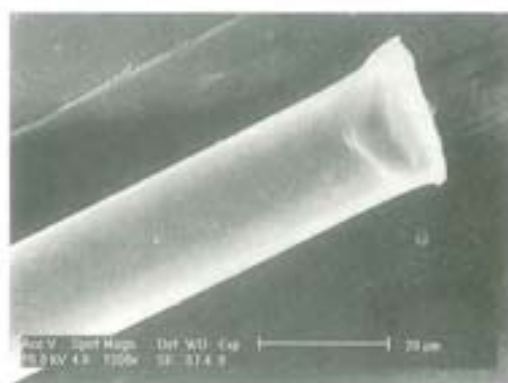
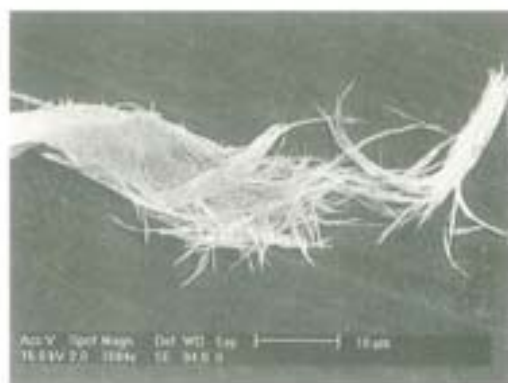
### Asbestos

Asbestos industrial application dates back nearly 130 years, becoming largely diffused in building and industry because of its peculiar alkali, acid and fire resistance properties. At once many researchers were commissioned to test asbestos effects on man's health, starting by investigating miners and subsequently the personnel in charge of manufacturing asbestos-based products. Both cases revealed remarkable risks to man's health. With further possible lung diseases (asbestosis) that can turn into tuberculosis or heart-disease; and mostly in smokers, cancer. More recent research was carried out on environmental situations, collecting data regarding the diffusion of asbestos fibers in the air which could represent a real hazard for the populations, even if, due to objective difficulties connected with

this kind of research, the results are not always matching. In any case it was decided to strictly regulate its use and today its application is totally forbidden. As we already stated, the asbestos, in spite of low percentages (1-2%) compared to other building sectors, used to be employed to manufacture cement-based adhesives for ceramics. With the purpose of improving its low slump, the adhesive manufacturers had to adapt themselves to the circumstances. A few manufacturers, such as Mapei, acted ahead of time without waiting for the laws to come into force. As a consequence of vast research, a record has been established specifying alternative materials that are able to avoid low slump, thus allowing the material to perform the same technical characteristics.

### Formaldehyde

Formaldehyde was largely used in many



fields due to its disinfectant and bacteria killing properties. A series of animal tests showed it as a highly toxic material which could cause cancer. Although the data is sometimes contradictory and the dosage as anti-fermentative in the adhesive for construction is below 1%, a few manufacturers, including Mapei, preferred to replace formaldehyde with less dangerous substances. Whereas asbestos use is ruled by several laws throughout the world, formaldehyde is still free to be applied, and the existing laws only require the correct labeling of the products in which it is embodied.

#### Pentachlorophenol and Its Salts

Such products used to be chiefly employed as bacteria killing and antifungal. Advanced research revealed the products' high toxic effect when ingested or skin-absorbed. Many incidents took place and a few European countries have disallowed their use. Until recently, pentachlorophenol and its salts used to be employed in very low quantities, down to 0.5%, mainly with water-dispersion adhesives suitable for ceramic, carpet, wood, linoleum and vinyl floorings. So far in Italy there is no law forbidding the use of these products. Nevertheless, Mapei and the most reasonable manufacturers, replaced pentachlorophenol and its salts with less toxic materials.

#### Methanol

Methanol is a chemical substance used in the field of adhesives because of its proficient solvency and high volatility allowing for a very short drying time. Even though it is flammable and toxic, this product is still used throughout Europe, and thereby required to be labeled as a harmful adhesive even when it is used at percentages of 3%. In Italy the use of methanol is forbidden (law nr. 408, 7/28/1984) and has been replaced by

national manufacturers with less harmful solvents. However, it is not rare to find methanol-based products.

#### Organic Solvents

The problem with volatile organic solvents is the most complex, and certainly not yet totally solved.

The organic solvent-based adhesives generally feature high risk of inflammability, causing accidents on the job-site such as fires and explosions; sometimes with dramatic consequences. However, the most impending danger is not due to its inflammability but to the harmful effects these substances have on the installer's health, who is subject to a high concentration of organic vapors, without sufficient protective measures. Such solvents are also dispersed in the air during laying, thereby increasing the pollution rate outside and inside the rooms, and the fumes linger for a long time after installation.

While waiting on laws restraining the use of volatile organic substances, the most safety-oriented adhesive manufactures, among which is Mapei, tried to use different routes by developing and marketing water dispersed adhesives that, to the best of our knowledge, can be



*X rays diffractometer to analyse powders. In this case it is useful to state the lack of the crystalline quartz which causes cancer*





According to the strategy of offering increasingly safer products and of timely assisting customers, Mapei took up the European standards concerning package wrappings for flammable and hazardous products. This is the reason why Mapei already provided new shapes and sizes in its new packings (side picture). Such variations are also shown on the 1996 price list, currently distributed. Our sales personnel are, as usual, at your disposal for further information and assistance.



considered harmless and non-polluting. Despite the great effort in researching water dispersed products as an alternative to the organic solvent matter, there are still a number of applications where water dispersed products are not used; for example, rubber and sports floorings. In these sectors the problem of flammability and environmental pollution can be partly solved with the use of multicomponent reactive adhesives with a low rate of volatile organic substances like epoxy or polyurethane adhesives. Being an irritant, such products can cause skin-sensitive problems which can be avoided by using gloves and protective creams.

#### **New Frontiers**

Mapei's effort to solve problems concerning safety and environmental protection starts from the product's project and at the very first stage of the research with raw materials.

As a rule Mapei does not make any use of substances not previously tested from a safety standpoint, and checks the safety data sheets supplied by manufacturers of raw materials.

This kind of selection avoids the use of all substances that, based on the most updated scientific information, are dangerous for people and the environment. There is constant training of Mapei's technicians and managers on safety subjects through wide participation of national and international technical committees.

There are regular updates of the data concerning chemical hazards and safety precautions.

#### **Production**

Mapei's productive process is handled from a safety and environmental point of view.

#### **Emissions**

Mapei has equipped all of its installations with a wide range of systems for intercepting gas emissions by collecting them in a chimney where the concentration of volatile organic substances is periodically checked. During the last four years in the Mediglia plant, the rate of such emissions was reduced from nearly 13 gr. per ton to approximately 11 gr. per ton. This was accomplished by either setting up a program that requests the suitable installations or by reducing production of organic solvent-based adhesives. The hoods of the cement-based powder manufacturing plants are equipped with a filter system that dampens all dusts while constantly monitoring the quality of the air emitted into the atmosphere.

#### **Homologated Packing**

Since 1991 Mapei supplies flammable and corrosive adhesives wrapped in packing homologated from the properly authorized national bodies, according to the ADR provisions. The European agreement for

## Eco line: environmentally sound products from Mapei



The logo on the right identifies all our solvent-free products in North America



OUR ENVIRONMENTAL COMMITMENT

the international road transit of dangerous material already in force in all European countries, will not be compulsory in Italy before the 1st of January 1997.

### Rejecting and Recycling Waste Material

In addition to complying with the ordinary laws, Mapei invests in eliminating waste material by share participation to the 3r Associates S.p.A. union. The task of this union is to provide its members with installations (dumps, destructors, chemical-physical-biological treatments), as well as with supporting services which allow the members to eliminate their waste material (laboratories, transportation, temporary stocking), while at the same time granting the correct rejecting progress and controlling the waste material market price.

installer should always read the information shown on the label, whether it is technical or concerning a hazard. We have the perception this custom is not widely used. Besides the manufacturers, like Mapei, that already label their products in compliance with the European set of standards, unfortunately there are few firms that do not even follow the local regulations.

Today in Italy and Europe there still exists manufacturers who are labeling their packaging or whose labels are incorrect or incomplete.

This situation should improve in the future as consumers become more informed and demand more information on the products. Consumers will use only the manufacturers who are the most reliable from either a technical and performing standpoint or the worker's health safety point of view.



*A flower, an alembic, a symbol. From 1987 our logo indicates all Mapei adhesives which are free from flammable solvents and therefore do not require the fire prevention certificate for flammable substances.*

### CUSTOMER ASSISTANCE

#### Labeling

Labeling represents a milestone device for the laying products' user, since it is the first essential and defined source of information about their use and risks.

The information about the products hazard, which must be shown on the labels, as ruled by a European set of standards (EEC 88/379) and by Italian norms include the commercial name of the product, the name of the manufacturer, and the following indications: a black on orange symbol indicating the level of danger (a skull with crossed bones used to tag a toxic product, a flame to mark a flammable product, etc.), signal of the hazard level written below the symbol (toxic, harmful, irritant, flammable), the chemical name of the dangerous substances embodied in the product, a brief explanation of the specific risks deriving from the dangers represented by the symbol, and safety hints while using the product. Before starting the work, the

#### MAIN EUROPEAN DIRECTIONS ON DANGEROUS SUBSTANCES AND COMPOUNDS

EC STANDARD	SUBJECT
67/548 and following 7 modifications and 21 regular updates	Classification, packing, labeling of health hazard substances (Last adjustment EC 94/69 dating 19.12.94)
88/379 and following 3 regular updates	Classification, packing, labeling of health hazard compounds (Last adjustment EC 93/18 dating 5.1.93)
91/155	Specific information system conditions concerning dangerous compounds (safety data sheets)



*A safety data sheet accompanying a product, in this case an epoxy sealant*



direct action from the user, who shall tirelessly require data sheets concerning toxicity before buying a product, will eventually constrain all laying material manufacturers to respect the standards.

#### Direct Phone Assistance

In addition to the law and safety data sheet labeling, Mapei offers its customers direct phone assistance to answer the technical questions for a products' safe use and an environmentally friendly attitude.

This is the last step of the direction in which Mapei is committed. "Total Safety" is becoming the goal of the Nineties for the adhesive manufacturers from all over the world.

If you have any questions regarding our safety and environmental standards, please call us at 1-800-621-6491 (USA) or 39-02-37673.1 (ITALY).

#### Safety Data Sheets

Labeling provides essential guidelines as far as the technical performances are concerned, but such information often needs to be expanded.

This is the goal of the European standards which has made it compulsory for the dangerous compound manufacturers to supply the professional user with the safety data sheets. The safety data sheet is a pool of data and advice divided into sixteen sections:

- Product and Manufacturer Identification
- Information of the Content
- Danger Identification
- First Aid Actions
- Fire Extinguishing Actions
- Maneuvers In Case of Accidental Spilling
- Preparation and Stock
- Personal Protection
- Chemical and Physical Properties
- Stability and Reactivity
- Information About Toxicity
- Information About the Environmental Impact
- Waste Material Treatment
- Information About the Conveyance
- Information About the Set of Standards
- Other Information

The safety data sheets are ruled by the same conditions regulating the labels, not all manufacturers are "blue chip". Only a



**PAOLO MURELLI and  
ROBERTO LEONI**

Paolo Murelli took a degree in chemical engineering at the Politecnico of Milan and is responsible of the Quality Control. Roberto Leoni took a degree in industrial chemistry at the University of Milan and is responsible of the Mapei Special Projects for Research and Safety.

# THE CERTIFICATE AS A STARTING POINT

ISO 9001/EN 29001 QUALITY SYSTEM CERTIFICATE.

On the 10th of February 1995 Mapei gained the Quality System Certificate in compliance with the ISO 9001 standard for research, development, production, trading and assistance to customers of adhesives and chemical products for building and industry.

This prestigious certificate was bestowed upon Mapei from Certichim, the Quality Certification Institute, member of the European network, for activities carried out in Milan and in the two production facilities of Robbiano di Mediglia and Latina. All of Mapei's output, adhesives for installing ceramic, wood, resilient, textile floor and wall coverings, as well as the chemical products for building, have been certified.

Over the years Mapei devoted much care to the quality of the products and service in order to satisfy the customer needs. Therefore they did not consider this Certificate as a passing success, but as a commitment to maintain the best quality products through constant technological innovation and organizational improvements. Mapei is the first Italian company in the field of adhesives to obtain the ISO 9001 Certificate, the strictest and the most challenging standard. The ISO 9000 standards, through its ISO 9001/9002/9003 subdivisions, represent the guidelines for the development and fulfillment of a company's Quality System. Mapei submitted its Quality System to the ISO 9001/EN 29001 certifications, constantly checking the company throughout its activities, from planning and development of the formulations, to product manufacturing and technical assistance to their customers.

Inside the Mapei group, several subsidiaries, such as Mapei Canada, Mapei France and Vinavil Italia (already certified with the ISO 9003/EN 29003), have started action to gain the quality system in compliance with the ISO 9001 International standards.

*This trademark identifies the Mapei Quality System. In order to gain it, it is necessary to pass twenty different examinations.*

*Mapei passed them all. So far in the MAPEI Group just Mapei S.P.A. and VINA-VIL S.P.A. gained the ISO standards for research, development, production and trading. MAPEI Corporation in the U.S.A., MAPEI INC. in Canada, MAPEI France S.A. in France and MAPEI G.m.b.H. in Austria are on the home straight. All the rest of our affiliates will follow shortly.*



## CERTIFIED QUALITY

**Mapei quality guarantee is based on:**

- Involvement of the whole company
- Determination and direction by Senior Management
- The managers' example to insure all personnel understanding of the project
- Quality activities' documentation
- Systematic inspection of conformity with the procedures
- Critical attitude to processes, not to workers
- Improving communication and mutual relationships

Mapei is leading the world through technology and the ISO 9001 Certification provides a valuable tool to maintain that leadership.

**Mapei customers and operators have the following benefits:**

- Hightech and best quality products and service
- Constant improvement of products and performances, always offered at competitive levels
- Competent assistance and support for the solution of practical problems on the construction site
- Training and information concerning the application of proper techniques to use the products, to respect the environment and to have the operators work safely
- CERTICHIM systematic control to ensure conformity with the Quality System and with the ISO 9001 standards





## CERTIFIED QUALITY

On the 10th of February 1995 Mapei S.p.A. gained the Quality System Certificate according to UNI EN ISO 9001 standards for "research, development, production, trading and assistance to customers of adhesives and chemical products for building and industry". CERTICHIM, the Quality Certification Institute, member of the European Quality Network EQNET, bestowed upon MAPEI the prestigious Certificate for its activities carried out in Milano and in the two production units of Robbiano di Mediglia and Latina.



*Mapei gained two certificates: one was bestowed upon them from Certichim/CISQ, the other one was from EQNET, which extends its reach throughout the main European countries. This latter is particularly important since it is officially recognized by such boards as BSI (England), AFAQ (France), DQS (Germany), SQS (Switzerland) etc...*

### A WORLDWIDE PRESTIGIOUS CERTIFICATE

*According to the guidelines issued from the European Community in the field of certifications with the birth of EQNET, the European Quality Network, several National Certification boards were collected. In Italy they are represented by CISQ. The Certifying boards are ruled by CISQ.*

### EUROPEAN COMMUNITY

ISO 9000/EN 29000

EQNET

CISQ (ITALY)

CERTICHIM

THE ISO 9001  
QUALITY SYSTEM  
INVOLVES THE WHOLE  
COMPANY

**“W**hat consequences occur from applying the ISO 9000 standards to the daily activities of the company? What are the effects of the certificate Mapei gained? We asked these and other questions of Dr. Nazario Borghetti, head of Mapei's Quality Assurance.

**Q: First of all, what are the ISO 9000 standards?**

**A:** The ISO 9000 standards represent a group of norms prescribing the establishment of quality systems in relation to the company's organization, task and market. In particular, the ISO 9003 standard states the principles to be followed to ensure the quality of the final product, before shipping to the customer. ISO 9002, adopted in most chemical factories, fix the criteria to guarantee the manufacturing and supplying quality of the product or service. ISO 9001 is the most comprehensive and restraining norm including the requirements of the two standards listed above in addition to insuring quality in the R & D Centers. This is applied to those companies, like Mapei, which operate in constantly evolving markets, whose customers need competitive and highly innovative products they can rely on.



**Q: Mapei chose to be certified to ISO 9001. What does it mean in practical terms?**

A: This means that Mapei realized and wants to hold a quality system that is suitable for all the customer needs, including the most demanding ones. The ISO 9001 certification is the mark that shows the company's commitment to maintain quality over the years and to adopt all necessary actions to prevent mistakes and to improve its performance. An inspection program has been established throughout the company's divisions, to ensure the standards are properly applied.

**Q: Who is in charge of checking that the standards are properly applied?**

A: It might come from within the company, such as a customer interested in examining the quality or an external certification institute. The latter is most objective and provides an excellent view of the various functions.

**Q: The whole procedure seemed to require a lot of effort in terms of time and staff. Who was involved in the undertaking?**

A: Quality is not a label you may adopt only by saying "We have quality!", but it is a recognizable fact that has to be acknowledged by our customers. This process calls for time, training and constant involvement from the entire staff. All of the organizations levels were involved, trained and made part of the team work. The quality of the company's performance is the result of many single efforts together with the ability to cooperate and achieve common goals.

**Q: What was the role of the Senior Management?**

A: Senior Management had a determining role for the enterprise to be successful. They provided means and resources to properly match the quality system with established goals.

**Q: Which are the elements you consider essential to set up a quality control system?**

A: First of all, a very important role is played by the determination of Senior Management and by the managers' full involvement, whose example is essential to obtain all personnel understanding of the project. A training program suitable for everyone clarifying the documented procedure must be understood and applied. You need great desire to grow and improve.



#### GENERAL NEWS ON THE ISO WORLD

The first standards were derived in 1947 from the U.S. Department of Defense. Thereafter they were adopted by the U.K., but always exclusively by the military field. The International Standard Organization (ISO, located in Geneva) realized the importance of the standards and in 1987 created the ISO 9000 series drawing CE attention. Standardization is a basic element of the unification movement. CEN (the European Committee for Standardization) started working and the ISO standards were renamed EN 29000. All CE members and EFTA subscribers have been committed to translate and adopt them on a large scale.





## WE ARE THE CHAMPIONS

By year end 1995, the Mapei/GB Professional Cycling Team, had left all others behind. They were first place in the world. There must be something magical in cycling. A matter of sweetness, tenderness and goodness. The multinational team is exemplified by riders hailing from 4 different countries, but having a common goal - winning together. Such qualities lead the Mapei/GB team to be held in high esteem by everyone. Mapei/GB team entered the world of cycling quite recently. It is like a young colt. Twenty-eight racers traveled all over the world with Mapei/GB in their hearts. This allowed the team to grow together, developing a close-knit relationship. No less than seventy were the victories won by the men wearing the Mapei/GB jersey, without discussing the wins on the indoor tracks. MAPEI's team is suited for breaking records, and seemed destined to set a very important cycling record in 1995. It was indeed the only team able to win during the same season both the individual (bravo Museeuw, you are greatest) and the team World Cup. Museeuw and Ballerini turned the track into a path of glory. At the Giro d'Italia (Tour of Italy) the Mapei/GB team had all its men drawn up to protect the super leader Toni Rominger, the real "pink avalanche". In Columbia, after Abraham Olano won the World Championship, someone will probably feel like dedicating a square or a street name to honor the team, since "El Libertador" (the liberator) Simon Bolivar already has many in that area ... "We are the champions" sang Mapei/GB team racers during the party thrown at the end of the season. Never was a soundtrack more appropriate. Mapei/GB: your horizons of glory will never die.

*The MAPEI GB team surrounding the cake in honor of the world champion Abraham Olano (at left) and of the winner of the World Cup Johan Museeuw (at right)*



# ROMINGER THE PINK PANTHER

by Alessandro Brambilla

**T**oni Rominger and the 106 victories, such as the number of medals he gained during his career with 16 successes in 1995. The Swiss of the Mapei/GB team started the season at a "light trot", mainly thinking of the Tour of Italy. He had an old reckon with our pink race. Being a first-rate racer allowed him to win one lap of the Tour of the Basque Countries (Spain) in the month of April. The thirty-four year old rider born in Denmark and located in Montecarlo, turned into a counterfooted in the last lap of the Tour of Trentino (Italy), shocking the Italian "big" with his athletic vigor. The real dress rehearsal awaiting the Tour of Italy was the Tour of the French Switzerland, one of the best organized races. On the Swiss mountains the champion won three laps (two of which were time trials) and the

Rominger repaid them and the staff with champion's high notes. Toni, racing in the rain, towered above the second day's time trial in Umbria (Italy). The fourth day, on the hills where our great poet Giacomo Leopardi grew up, he performed a masterpiece of tactical clearness of mind and athletic fitness, eventually winning the lap. In Campania (Italy) at the Maddaloni time trial, Toni left behind the Russian Berzin in 1'12". He repeated himself in the Prealpi Orobianche (Italy) time trial in front of 150,000 spectators. In Milan an oceanic crowd bestowed the deserved ovation upon him. Rominger won the Tour of Italy the Merckx's way. It is necessary to underline that the Swiss of the Mapei/GB team keeps holding the tour record.

On the fifth of November 1994, on a customized Colnago bike, he covered 55,291 kilometers in sixty minutes. Not even a champion made of good stuff and power such as the Spanish Indurain was able to take the record away from him. The Spaniard tried to beat him in Columbia, but after half an hour he gave up.



Toni Rominger at the finish of the Loreto Lap (Tour of Italy)



Toni cumbing a mountain lap of the "pink race"



final classification. At the Tour of Italy the Directeurs Sportifs Juan Fernandez and Fabrizio Fabbri prepared a perfect crew. In consideration of the all time trial profile, it was the hardest pink race during the last twenty years. The technicians kept out the riders who usually perform their best on classical tracks, thereby sacrificing few lap wins in favor of a safer strategy during the mountain track races for "King" Toni. Arsenio Gonzalez, Miguel Angel Pena, Francisco Javier Mauleon, Daniele Nardello, Andrea Tafi, Andrea Noe and Jon Unzaga were an ironclad team.



"King Toni"



# MUSEEUW AND THE WORLD CUP



*Johan Museeuw on the podium of the Laigueglia Trophy*



*Museeuw gearing up at the "Ronde Van Vlaanderen"*

1995 was also victorious for **Johan Museeuw**. The Belgian, located in Gistel, started with the winning sprint in Laigueglia, the "blue bank of Europe". The lap success at the Criterium of the Ardenne was a spring-board in view of the Tour of the Flanders. At the "Ronde Van Vlaanderen" the Mapei/GB team coached cycling lessons.

The gladiator **Andrea Tafi** flew for the 170 kilometers. When the group reached Tafi, Museeuw entered into the action. Johan, who won the Tour of the Flanders in 1993, performed the winning lengthening-piece on the terrible Grammont barrier. The greedy Museeuw also awarded a lap and the final classification at the "Four Days of Dunkerque". In August Museeuw dominated the Zurich Championship, a



*Franco Ballerini in a dust cloud at the Paris-Roubaix and at the finish*

World Cup trial, at the "Course du Raisin", and thus demonstrating to be a first-rate racer also in time trials, the Eddy Merckx Gran Prix. In September in Klooskamp and in Bavikhove, Museeuw prevailed in the individual World Cup with a trial of advance as regards the end of the challenge. Eventually **Franco Ballerini** was able to win the Paris-Roubaix, queen of all the classical races. An amazing result since only a

few days before the infernal appointment, Ballerini dislocated a shoulder. Not even a tire puncture in the last stretch stopped Ballerini from his solitary arrival, his face covered with "noble" mud at the Roubaix cycle-racing track. In 1995 "Ballero" also won the Het Volk competition, the opening race of the Belgian calendar. Museeuw's victories at the Flanders and in Zurich, Ballerini's victories at Roubaix and the rest of the team's victories allowed Mapei/GB to win the team World Cup.

*Giorgio Squinzi with the world cup, surrounded by the racers participating at the Tour of Lombardia*



*Daniele Nardello receiving the cup for second place at the Tour of Lombardia*





# THE WORLD CHAMPION OLANO AND THE OTHERS



deserves to be included in the World Cup. Also **Daniele Nardello** allowed Mapei/GB to conquer the team "Cup". **Adriano Baffi**, following in his father's footsteps, donated eight victories to Mapei/GB during the season.

Moreover he won the final classification and the Vuelta a Murcia (Tour of Murcia), a lap race. As far as crowded finishes are

*Abraham Olano crossing the finish line that made him world champion*

*Olano kissed from the two misses for his second place at the Vuelta*

**A**braham Olano, a Basque from Altzo Guipuzcoa, was ill-fated until July. A fracture stopped him from participating at the Tour de France. At the Vuelta of Spain he wore the leader jersey for a few days. By winning all three time trials the Spaniard has been an indomitable adversary of the magnificent winner, the French Jalabert. Abraham terminated the Vuelta by taking second place in the classification. Thanks to his riding at the Tour of Spain as a protagonist Olano found the right pedal push to win the Spanish national road championship at Duitama. Olano is the first Spaniard to ever win such a competition.

At Duitama despite a tire puncture 500 meters far away from the finish, Olano preceded Indurain and Pantani at the conclusion of an eliminating trial, where several "big" racers got into many difficulties because of the height. Olano won three more races in Spain before ending the season. **Frank Vandenbroucke** is the most promising among the young riders of the Mapei/GB team. The twenty-one year old Belgian; demanded by the team at all costs from Patrick Lefevere, one of the Mapei/GB Directeurs Sportifs; was able to win six races. Among those was the never-ending Paris-Bruxelles, a race that

concerned, **Federico Colonna** is a milestone piece. The sprinter from Tuscany signed 5 successes, all in Spanish races. **Stefano Della Santa** made a shot start, triumphing at the Ruta de Sol. Yet at the Vuelta Valenciana he fell under a



*Abraham Olano during the individual chrono race at the Vuelta of Spain*





World championship 1995.

- First place: Olano
- Second place: Indurain
- Third place: Pantani

Below, Johan Museeuw between Franco Ballerini and Stefano Della Santa

guardrail and broke the femoral bone. He had to stop riding for three months and went back to victory in July in Zamudio (Spain). Mononucleosis did not allow **Gianluca Bortolami** to be as amazing as he was in 1994 when he won the World Cup. In 1995 he just gained the Du-Pont time trial, in the US.

The Italian **Andrea**

**Chiurato** concluded the year by winning three times. The same spoil of **Wilfried Peeters**, a powerful Belgian rider. The other Belgian **Bart Leysen** enjoyed his success in the Harelbeke and Merksem Gran Prix. **Carlo Bomans**, who won the Belgian Championship in 1989, was able to gain a win in Dilsen. We should not forget **Fernando Escartin Coli's** victories. The Spanish climber was victorious at the



Baffi sprinting at the Vuelta of Spain

Below, Daniele Nardello



Valli Minerarie Tour, at a lap and at the final classification in the Aragona and in the Saragozza-Sabinanigo Tour.

The 1995 Oscar of bad luck in the Mapei/GB team goes to **Marco Bellini** and **Dario Nicoletti**; this latter was even run over by a motorbike. We can only wish continued success for the Mapei/GB team in 1996.



# MAPECEM: THE FAST-CURING HYDRAULIC BINDER

by Adelmo Bovio and Paolo Murelli

In our first issue, part one of this article showed a detailed description of a diffusely tested special hydraulic binder named MAPECEM, which properties we will shortly resume in the following writing, in particular when exploited for ceramic tile and natural stone floorings (see *Realtà Mapei International* n°21, pages 25-28).

When mixed in the correct proportions with properly graded aggregates and water, this cementitious binder has the remarkable ability to harden practically shrinkage-free in a few hours, whilst dries completely within 24 hours regardless of screed thickness, with a residual moisture content less than 2% by weight. Because of these qualities and its extremely high mechanical strength, MAPECEM is an ideal binder for constructing floating concrete slabs or bonded screeds from 10 to 80 mm thick. In table 1 we compare some characteristics of ordinary Portland cement with MAPECEM: using a plastic mortar prepared in compliance with Italian standards, MAPECEM is already dry after 24 hours, and its shrinkage after 28 days is approximately one-tenth that of Portland 325 cement.

Let's briefly sum up the main features of this innovative product when employing ceramic tile and natural stone floorings. The setting method most often used when placing terra cotta is a conventional thick-bed mortar from 3 to 7 cm thick.

This mortar is composed of aggregates and binders that liberate calcium hydroxide in the presence of moisture such as that contained in the bed-mortar.

The calcium hydroxide tends to migrate to the surface where it reacts with the carbon dioxide constituting the atmosphere and as a consequence it ends showing up an unsightly whitish efflorescence of calcium carbonate on the surface.

This reaction continues as long as there is moisture in the bed-mortar: a well known phenomenon to tile-setters usually

constrained to wait up to two or three months before terra cotta can receive its final treatment.

Using MAPECEM binder, an advanced system has been developed which makes a terra cotta floor ready for final treatment in only 72 hours.

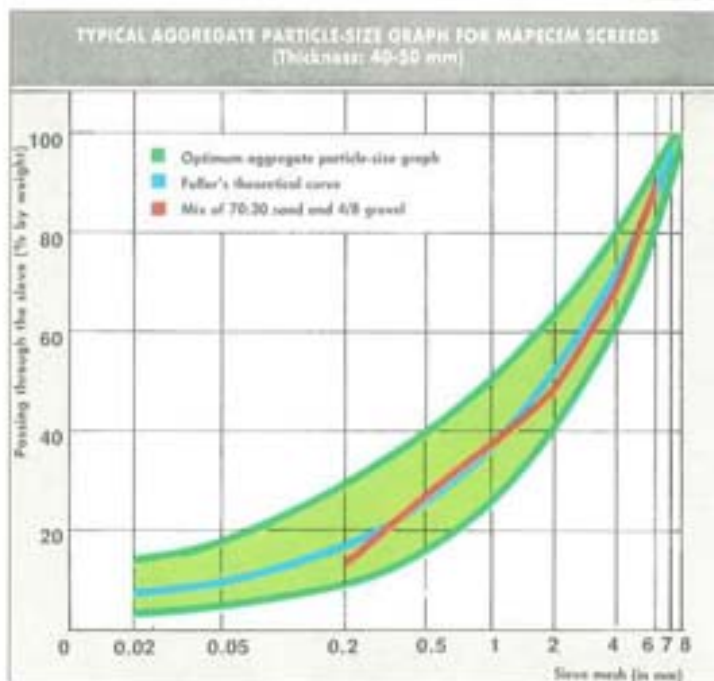
The setting of floor coverings with this cementitious binder is prepared by manufacturing a screed of 4 to 8 cm (depending on the thickness required), on which terra cotta can be set after 4 to 6 hours.

Terra cotta must be applied with



Screeding with MAPECEM

Table 1



GRANIRAPID, a two-part adhesive mortar which consists of a synthetic rubber latex and a powder composed of MAPECEM and accurately graded sand (for further detailed information about MAPECEM application for terra cotta setting see n°21 of this magazine).

When setting natural stone the principal problem is related to the prolonged presence of moisture in the mortar. As a matter of fact calcareous stone such as white marble or German Jura marble etc.





The parquet floor was laid with LIGNOBOND on a MAPECEM screed. On the connecting fractions and on stairs MAPECEM was levelled with ULTRAPLAN

often contain soluble impurities, which are dissolved by the alkaline water of the mortar and conveyed to the surface, causing stains that are sometimes widespread.

New technology has furthermore made it possible to cut squares, polished tiles of natural stone in thicknesses of 8 to 10 mm



Setting terra cotta tiles

with the consequent effect that these materials are often subject to considerable expansion and warping. Because of MAPECEM fast drying characteristics and low alkalinity compared to conventional cementitious binders, these problems have been completely eliminated allowing floorings to be polished only 24 hours after installing, an enormous advantage over traditional methods which normally require from 3 to 4 weeks. MAPECEM is also an ideal binder for materials sensitive to moisture such as resilient and parquet floors.

### Setting parquet floors

Wood is a hygroscopic material which has the capacity to absorb or release moisture according to environmental conditions.

This phenomenon provokes considerable movements, which, when proceeding from dry wood state (moisture value close to 0%) to saturated wood state (25-30% of moisture), have the following extension:

- 0,1% lengthwise to the fibres;

- from 2% to 8% transversely to the fibres and to the rings;

- from 5% to 15% transversely to the fibres and tangential to the rings.

Let's now detail the most frequent problems in setting parquet floors:

#### 1) Wood laid with the wrong percentage of moisture

Wood must be laid in hygroscopical balance with the environment : if wood is too dry it will absorb moisture contained in the atmosphere or in the vinylic adhesive and therefore it will

Table 2

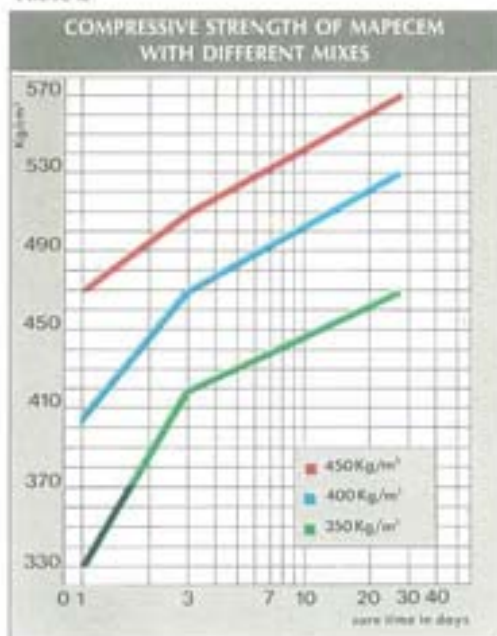
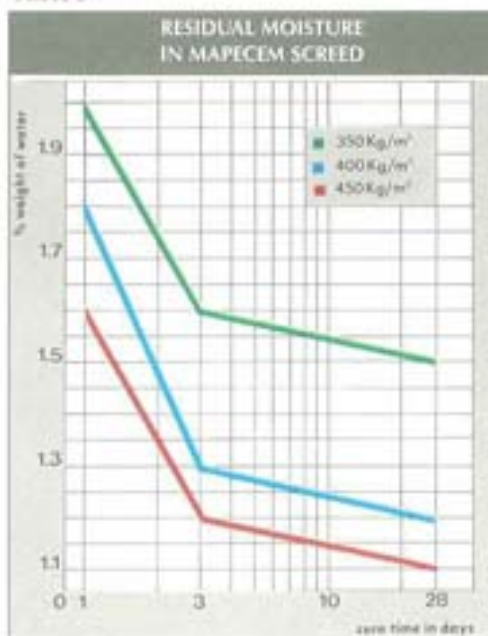


Table 3



dangerously expand; on the other hand if wood is too moist it will tend to dry and therefore crack on joints whilst sometimes considerably warping.

2) Bed screed's residual moisture content

It is extremely dangerous to lay on screeds containing residual moisture because this latter reacts with vinylacetate adhesives (which are still the most employed products with wood floorings), invalidating the grab and subsequently provoking wood's expansion.

A traditional concrete substrate of a thickness of 5 cm attains an acceptable residual moisture content only after at least two months (10-15 days per cm of thickness). This period can even be longer for greater thicknesses or in cases where the screed is cast during cold or very damp seasons.

3) Screed's rising damp

The situation quickly deteriorates if moisture rises from lower structures to the screed because in this case the phenomenon is not temporary. Rising damp mostly occurs when the screed directly lays on easy to absorb water insulating coats such as foamed clay, vermiculite, perlite, rock or glass wool layers, light-weight concrete or when the structure is not isolated from the ground. In this latter case the only solution is to put an effectual vapour barrier between the screed and the surfaces below.

We remind that standards and codes fix exact values for laying. Since it is always associated to the relative humidity of the environment where it is laid such value must vary from 8% to 13%, as shown in table 4.

**The solution**

The statements mentioned above make clear MAPECEM's benefits in forming screeds for laying parquet; MAPECEM is today's most advanced and unerring solution to the problem of moisture in laying wood.

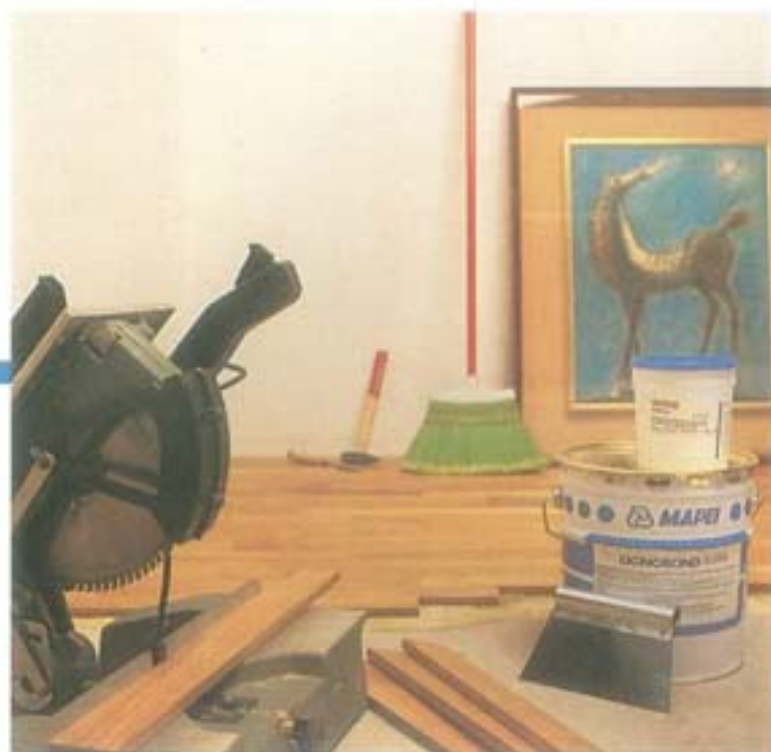


Table 4

Ambient relative humidity RH%	% Proper humidity of wood
30	6
40	8
50	9-10
65	12
70	13-14
75	15
80	17
85	19

*Setting large stripes on a MAPECEM screed with LIGNOBOND*

MAPECEM screed mixed with a ratio of 400-450 kg per m<sup>2</sup> of aggregates (graded from 0 to 8 mm) has the capacity to harden in just a few hours and to perfectly dry within 24 hours (residual moisture less than 2,5 %, suitable for laying parquet), besides it has an extraordinary mechanical strength (>40 N/mm<sup>2</sup>) and shrinkage is approximately one-tenth that of ordinary cement screeds.

If the surface is uneven or not sufficiently leveled MAPECEM can be smoothed after 4 hours from laying with ULTRAPLAN (a self-levelling compound with rapid setting). Moreover MAPECEM is an ideal binder to prepare screeds including dovetail batten that have to receive nailed wood strips where fast-drying is required. Parquet must be laid on MAPECEM with LIGNOBOND, a two-part polyurethane adhesive, cleared from free isocyanates and volatile solvents, which does not embody water whilst avoiding immediate or coming movements in the wood. LIGNOBOND's excellent elasticity allows to



*Smoothing the MAPECEM screed with ULTRAPLAN self-levelling*



*Setting of nailed parquet floor: the dovetail battens are buried into a MAPECEM screed*



*Preparation and levelling of the MAPECEM screed before laying the resilient floor*

LIGNOBOND's excellent elasticity allows to absorb small movements of the wood; its adhesion to MAPECEM or to ULTRAPLAN smoothing compound (when required) is perfect. By using MAPECEM + LIGNOBOND you can level and vanish the parquet after only 3/4 days from the beginning of the work, saving 60/90 days on ordinary time.

## Conclusions

We would like to draw your attention on three main mistakes in employing these advanced laying techniques.

a) We advise you against using vinyl adhesives on Mapecem screeds, which are by nature (if properly graded) very dense and little absorbent letting the wood assimilate most of the adhesive's water and thereby causing its expansion. Even the use of fast-setting vinyl adhesives with low moisture content, such as ADESILEX LC/R, do not bring many benefits.

b) MAPECEM must be properly graded. In order to increase the absorbing capacity of MAPECEM and therefore to be able to employ vinyl adhesives some people have reduced the coverage of the aggregates to 200-250 kg/m<sup>3</sup>; this behaviour is very dangerous because such reductions cause the following inconveniences:

1) Very high water/MAPECEM ratio (higher than 0,50) to obtain a trowellable consistency and therefore very long drying time, similar to ordinary concrete screeds.

2) Low mechanical strength, often inadequate to receiving a parquet, especially if the aggregates employed are thinner than proper.

c) MAPECEM must not be mixed with ordinary Portland cement.

The particular hydration of MAPECEM is totally stopped by Portland cement and as a consequence drying time becomes longer and mechanical strength becomes lower.

No responsibility will therefore be taken in case of mixing with ordinary cement.

The Mapei Rapid System for parquets must follow the directions and the indications stated above.

The results obtained so far have been incontestable and the laying of MAPECEM screeds for wood's floorings have had worldwide consent.

### Setting resilient flooring

Resilient flooring (linoleum, polyvinyl chloride, rubber, etc.) are characterized by low thickness, by impact strength, besides a common loathing for water consequently trapping it below the flooring after laying. As a consequence the positive buoyancy carried out from the water contained in the screed can be stronger than the adhesion of the bonding, causing detachments and the formation of bubbles.

Several countries' standards and codes, besides the document approved in Europe among resilient flooring and adhesive manufacturers and setters associations, expressly require cement screeds' moisture content to be below 2,5 % by weight before laying resilient flooring, and the blocking of rising damp below layers. A particularly delicate case is represented by anhydrite screeds (anhydrous calcium sulphate) for which the maximum admissible value is 0,5 % by weight, in order to avoid the danger of degradation originated by the presence of water in the screed which therefore hydrates to gypsum.

Setting resilient flooring with MAPECEM and complementary techniques allows to finish the floor covering within a maximum of 48 hours, whilst avoiding to wait the ordinary 60 days for the screed to be dry, and therefore pay very expensive fines for running behind the schedule.

As far as resilient is concerned the Mapei Rapid System can be shortened as follows.  
1) Preparation of a MAPECEM screed, with a mixing ratio of 400-450 Kg/m<sup>3</sup> of properly graded aggregates (0-8 mm) of the thickness required on a substrate isolated



*Setting PVC floors on a MAPECEM screed and, below, the look of the room once done*



from rising damp through a vapour barrier.

2) Smoothing the surface already after 4 hours with ULTRAPLAN, an ultrarapid self-levelling compound that allows to attain thicknesses from 1 to 10 mm.

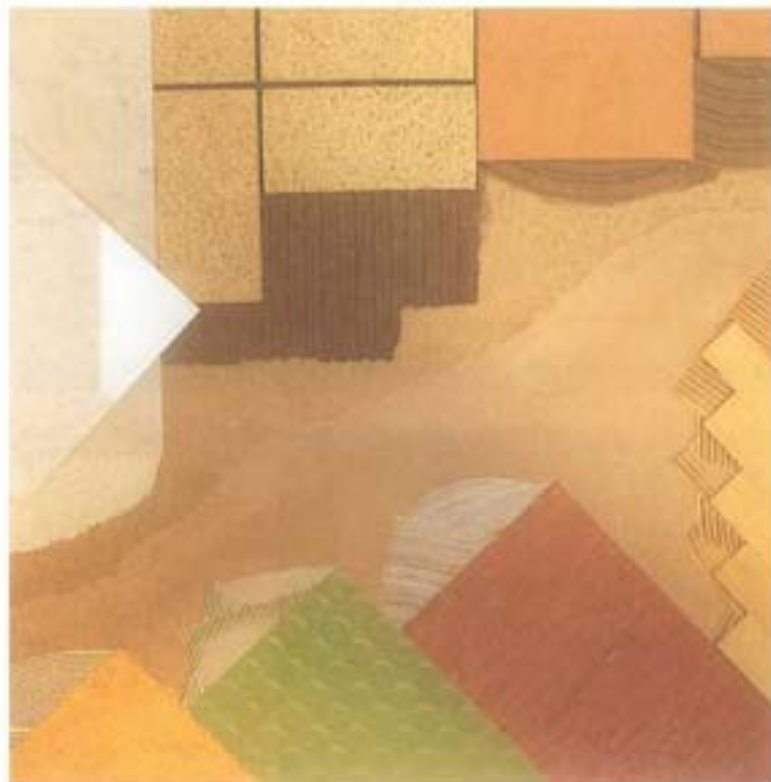
On the contrary if the task is to better the surface finish in only a few spots you can use NIVORAPID, an ultra-fast setting thixotropic cement levelling mortar.

3) Next day you can bond the resilient flooring with the suitable adhesive.



*Pouring the slurry bond coat for anchoring adhering Mapecem screeds*





*MAPECEM: an ideal screed for each kind of floor*

### Bonded screed

When existing thicknesses do not allow the execution of a regular substrate (at least 4 cm) MAPECEM could be employed for realizing a bonded screed integrated to the support through an adhesion promoter. When the thickness is below 2 cm (and only in this case) the aggregate particle size can be reduced, reminding that the maximum admissible diameter is 1/3-1/4 of the screed's thickness.

A bonded screed could be applied also on old existing floorings, provided that they get polished from every trace of waxes and dirt through an effective washing (with water and soda or with wet sandblasting, etc.). We remind that since a bonded screed does not allow the placing of a vapour barrier it will not be able to protect the work from possible rising damp of the lower layers.

The promoter employed will be EPORIP, a two-component epoxy adhesive for new-on-old bondings, to be applied within three hours before casting.

When the MAPECEM filling is executed on a surface with good grip capacity (for example a cement screed), after removing the loose matter, it is convenient to use as a primer a slurry bond coat composed by two parts of MAPECEM, one part of PLANICRETE and one part of water. In this case the preparation and the application of the slurry bond coat must be executed whilst casting, so that it happens "fresh on fresh".

### Substrates' partial repair

The versatility of MAPECEM allows its use also on localized intervention of little extent such as the restoration of old or damaged screeds or in case of filling grooves when you need to partially demolish old floorings in order to allow the embedding of several systems' pipes or sheath coatings. As a matter of fact the use of MAPECEM will eliminate drying time waits and the formation of shrinkage cracks. Also in this case it will be sufficient to use an adhesion promoter to integrate new-on-old bondings of MAPECEM.

### Conclusions

The MAPECEM Rapid System, if executed by following the recommendations and the advices pointed out, is ready for traffic after three hours, dry and ready to be smoothed after 24 hours whilst achieving in such timing a compressive strength of 350 Kg/cm<sup>2</sup>, with minimum shrinkage (10 times less compared to a similar Portland cement mixture) and therefore is ready after 24 hours to receive a sensitive to water flooring. Mapei Rapid System based on MAPECEM is a technology that has been consented to from the Italian and the foreign market with an astonishing favour.



**ADELMO BOVIO  
and PAOLO MURELLI**

Adelmo Bovio has worked for more than 20 years at the Mapei Technical Assistance of which he was head until 1987. He is currently in charge of the courses concerning the "Technical Training Mapei". Paolo Murelli, who has a degree in chemical engineering at the Politecnico University of Milan, is in charge of the Mapei's Quality Control department.



## Bridge of Rep-Tiles...

# 65-Foot Gila Monsters of Tile in Tucson!

A few summers ago Steven Spielberg came out with "Jurassic Park", a movie about dinosaurs and reptiles. Also the Michael Crichton best-selling book of the same name. In this issue of *Realty Mapei International* we present the twin Gila Monsters of Tucson, composed of 42,000 pieces of ceramic tile and an astonishing array of bric-a-brac and odd pieces. These huge 65-foot gila monsters are not just objects d'art; they just may help bring rain to the arid Arizona desert. At least they did last winter. Seems the Papago Indian tribe in Arizona reveres the gila monster as an omen of rain. It just so happened that soon after Wilhelm Tile started installing the tile, Tucson was hit by flash flood rains for 4-5 straight days, the heaviest in 10 years. A coincidence unheard of

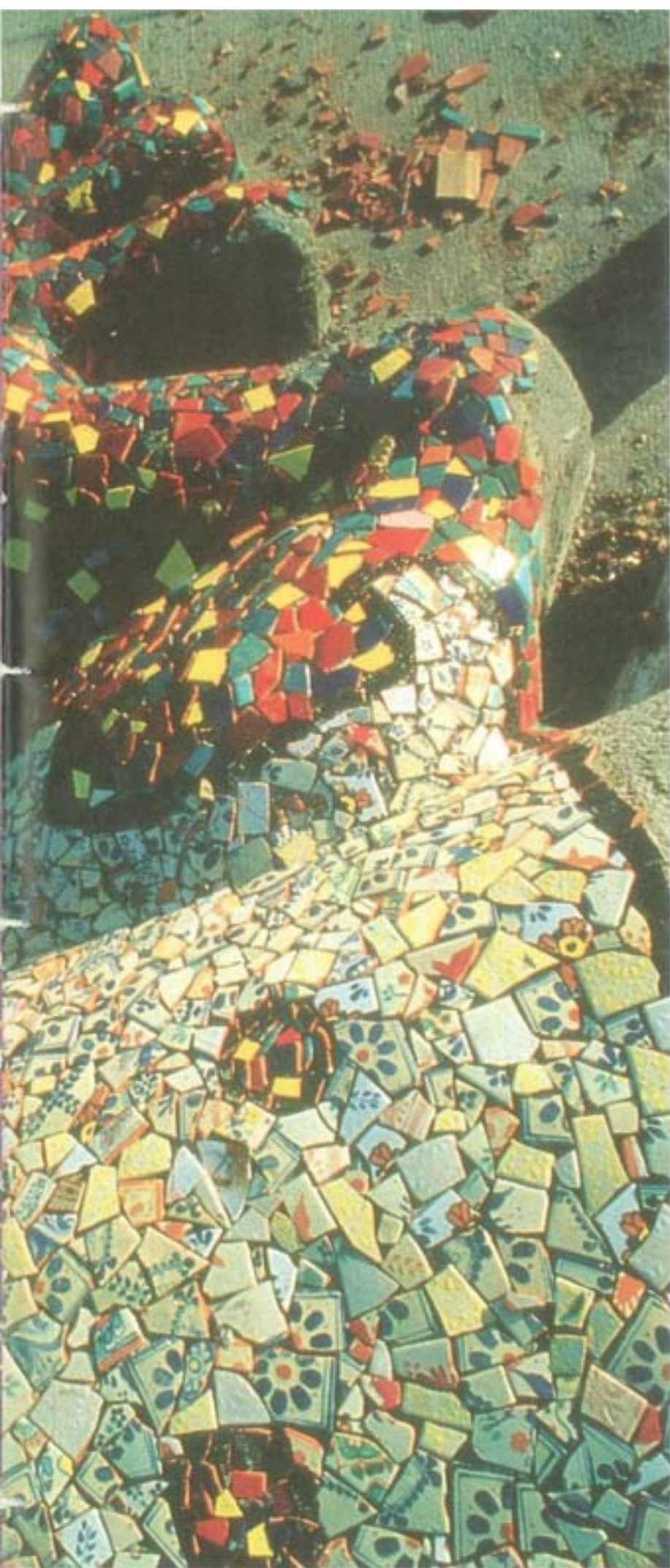
during this time of year. During dedication ceremonies, a Papago Indian Medicine man blessed the twin gila monsters for future benefits. If it keeps raining in Tucson we'll know who to credit...or blame. The monstrous, colorful lizards are Tucson's newest art form. Recently completed, the brightly patterned reptile lounge on the bridge that crosses the Santa Cruz River east of Mission Road on Irvington. Their tongues reflect the sun's rays through broken pieces of mirror. Wicked looking, both of the tongues are tiled with over 100 mirror pieces on monsters that spread across the median of the new Irvington Road Bridge. "The public's

reaction has been amazing," states tile contractor Dan Wilhelm. "Everyone's stopping, and everyone's been curious, and everyone leaves with a smile whether from appreciation or amusement." Dan and his brother Mike are owners of Wilhelm Tile, the artison/tile contractors who carried out the design of architect Bob Vint, with the support of Mapei products. They have covered the gila monsters with scales that combine shards of traditional Mexican-style tile with "mementos of Tucson's past and present", said Dan Wilhelm.

"What's most fun," he laughs, "is people who live around here kept bringing us pieces everyday and we kept adding them, like the guy who brought us a plastic scorpion," he recalls. He points out other odd pieces such as cup handles, ashtrays, mah-jongg tiles, a cue ball, marbles, a china place setting, a working harmonica, glassware, old tiles from the nearby San Xavier Mission, and an insect fossil. Even a vintage Elvis Fan Club Button. A small Virgin de Guadalupe is cemented in as well. "We were concerned about kids climbing on it or writing graffiti when we were working on it," Dan Wilhelm explains. "We put her here to protect us." And so far it has worked. Out of religious respect, the gila monsters have been spared though concrete surfaces around it are a graffiti mess. Each lizard has about 21,000 pieces of tile and round objects over a hollow body of gunite sprayed over a rebar skeleton. Each reptile is acknowledged by the Wilhelms and by architect Vint to bear a similarity to huge mosaic lizards designed by Spanish architect Antonio Gaudi (1852 - 1926) for Barcelona, Spain's Park Guell. "I've known about Gaudi and admired him since I was in architecture school," Vint







explained, "and I've always wanted to pay homage to him and to the desert. With so much folklore on gila monsters that typifies the Sonoran desert, it seemed like a way to combine both." Noting that one can spot things like teacup handles within the tile work on Gaudi's pieces, Vint said he's been saving broken china for this project for three years. Wilhelm Tile has been doing this sort of broken shard format, on a small scale, for the past three years. The Tucson company was selected by Vint to carry out his concept when he saw pictures of its work at the local Mexican Tile Company, a company that later provided the project's tiles, in a pattern called "Antiqua". The main requirement of the project was to resist possible vandalism, which meant using fast hardening, but long lasting products. The solution was found through the use of MAPEI products. Materials are set with the KERLASTIC/KERABOND (KERABOND+ISOLASTIC) system, a dry-set mortar system, ideal for difficult to bond natural stone, large porcelain and glass-bodied tiles. Thereafter joints were grouted with KERACOLOR FLOOR + PLASTIJENTS (KERACOLOR GROSSO + FUGOLASTIC), an easy-to-use durable grout with good abrasion and impact resistance. Such KERACOLOR system provides increased strength, density, flexibility, freeze/thaw resistance and decreased water absorption.

We thank "Tile Industry News Publication", (May/June 1993) from which the above abstract was taken.



# ONE, TWO, THREE... CATALOGUES



Three catalogues describing Mapei's specialty building products were designed to provide a reference to the most suitable products which will guarantee the best results for each application. Each catalog is numbered and includes either a guide for the correct product selection for a specific application, or product reports outlining the field of application, technical characteristics, suitability, careful technical installation instructions for each application, estimate coverage and available packs. These reports bear the date of publication to facilitate catalog updating. Catalog Number 1 features Mapei products for installing and finishing ceramics and like materials. Catalog Number 2 features Mapei products for installing and finishing resilient and textile flooring adhesives. Catalog Number 3 features Mapei building specialty line to meet design and building needs for both new construction and restoration in concrete. We introduce to you Catalogue Number 1 which contains:

- An introduction to the company
- An index of product reports
- A table-guide
- Product reports
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If you would like to receive our Catalog, contact your local Mapei Technical Service Representative or contact us at our headquarters in Italy by phone or by fax:

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