

INTERNATIONAL

# REALTÁ MAPEI



New flooring at the  
Vatican

Zaventem 2000

Mapei Corporation

Mapei Gb Professional  
Cycling Team



2



Inside Realtà Mapei International you will find the brochure "Sport facilities - Aquatic centres and swimming pools ... with Mapei products", in addition to the one dedicated to airports



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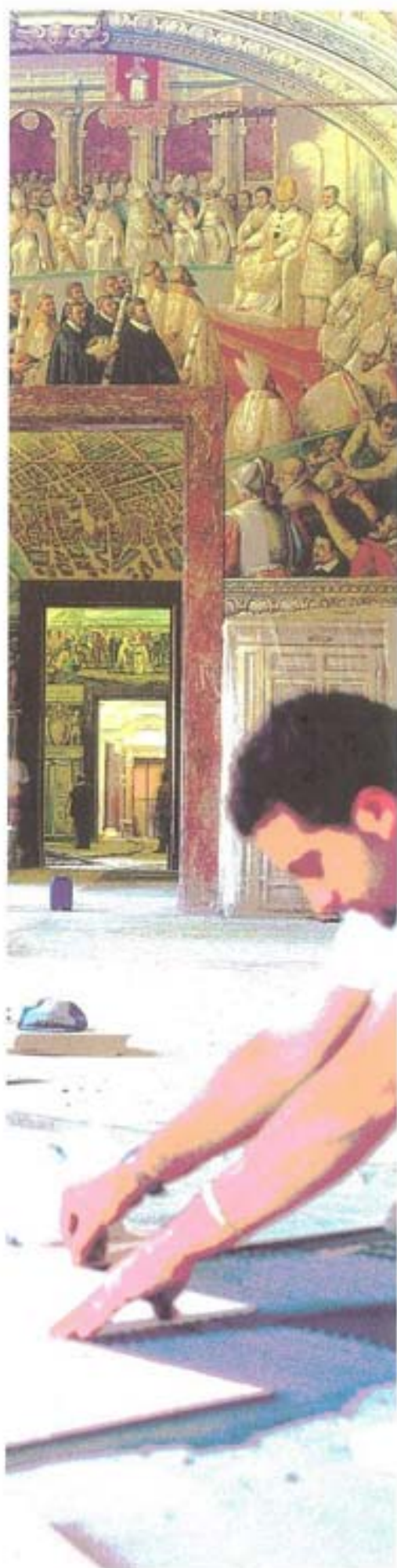
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# AN AIRPORT IN RECORD TIME

SEVERAL TOP ARCHITECTS, ENGINEERS, SPECIALISTS AND COMPANIES FROM DIFFERENT COUNTRIES COOPERATED TO RENOVATE AND EXTEND THE ZAVENTEM AIRPORT IN BRUSSELS. THANKS TO INNOVATIVE PRODUCTS THE SHORT TIME SCHEDULE WAS HONORED.

by *Aristide Mariotti and  
Francesco Stronati*

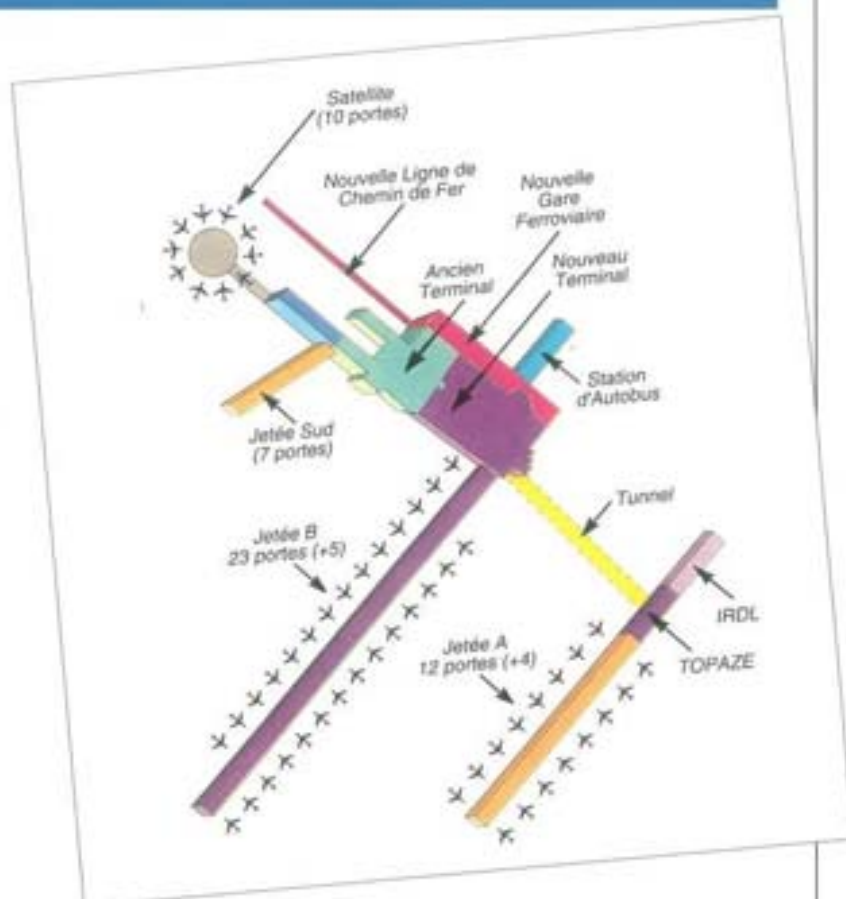
Imagine 500.000 m<sup>3</sup> (17657,4 c.ft.) of excavations, 240.000 m<sup>3</sup> (8475,5 c.ft.) of concrete, 27.000 tons of steel, 80.000 sq.m (861.110 sq.ft) of granite : this should give you an idea of the magnitude of the extension and renovation work at the Zaventem National Airport in Brussels.

The goal of this project was to provide faster and more updated service to the airport due to the ever growing number of passengers. While the current structure is indeed capable of handling 20 million passengers per year, the new framework is expected to achieve a capacity of 30 million travellers per year. The Zaventem project started in 1990 with the cooperation of several top architects and large companies from different countries.

In order for the airport to remain fully functional, the project was divided into three stages. During the first stage, the new terminal was constructed, in the second stage, the existing area was integrated into the new structure, and in the final stage (which has yet to be completed) a temporary building, which was erected during the initial construction phase, is replaced by a permanent one.

## An Invaluable Terminal

The new terminal is the key element of the project. It starts from the left side of the existing building and consists of 125.000 sq.m of usable space on eight levels, three of which are accessible to the public. The first level is assigned to the Arrivals, the second one to the Departures and the third to the Mezzanine. The Mezzanine is the main area in the terminal and it is built around a vast entrance covered by a cupola. The Administrative headquarters is located on higher levels while the automated baggage area is on the Arrival floor. Two main passageways called



## ◆◆◆ THE ZAVENTEM AIRPORT IN THE YEAR 2000 ◆◆◆ 1st STAGE : FACTS AND NUMBERS

### A HUGE JOB-SITE :

500.000 m<sup>3</sup> of excavations  
240.000 m<sup>3</sup> of concrete  
80.000 sq.m of granite  
27.000 tons of steel  
20.900 sq.m of glass

### AN AIRPORT IN RECORD TIME

285.000 sq.m with one building consisting of 104.000 sq.m usable space distributed on 8 levels  
A 215X115 m surface, the equivalent of 4 soccer fields for each floor  
4.850 sq.m of commercial surface reserved for sale  
1.900 sq.m of surface reserved for service  
1.990 sq.m reserved for the restaurants  
850 sq.m of surface reserved for the passengers' comfort  
1.923.000 cube m of air conditioning every hour  
40 approach gates with a total of 68 doors



**ZAVENTEM 2000**  
A new 125.000 sq.m airport

*Construction of the airport began in 1990. On June 14th 1994 the first section of the new airport in Brussels was opened to the public. In the future the old airport, built in 1958, will be renovated and integrated into the new project. Construction is expected to be finished in 2010.*



Diamant and Saphir connect the two floors. The first passage way, Diamant, is the most important one and it is characterized by an octagonal construction which allows the passengers to enter the airport at the Departure level or leave through the Arrival level. The Saphir passage way connects the Departure area and the Arrival area ; moreover, it permits easy access to the two restaurants located on the Mezzanine level. Seven sets of elevators, two of which are equipped with a special system for the handling of over-weight baggage, form a secondary communication system. Structure B is composed of 5 levels; two levels are for the technicians, one level is for the arrivals and another one, which was built perpendicular to the terminal, is for the VIP. While waiting to erect Structure A similar to B, another building called Topaze was built in order to create a vertical communication route.

*The underground tunnel, which connects the check in areas with the gates, was paved with marble. Two walk ways run the entire length of the tunnel.*



Topaze is linked to the terminal through an underground tunnel consisting of two moving walkways which span the entire length of the tunnel and a corridor for baggage transportation. In order to complete such a large project within the required time of 26 months, the structure was pre-fabricated with a post-tension technique.

Only the pillars were built on the job-site in their entirety.

This construction technique provided remarkable savings in time and prevented climactic conditions from affecting the job-site schedule.

#### Fast And Resistant Screeds

Before installing the floors in the different areas of the airport it was necessary to set the screed. The thickness of the screed varied from 6 cm (2.3") to 12 cm (4.6") and was composed of sand and cement.

For nearly 10.000 sq.m (107.640') the screed was composed of a cement-based mixture including MAPEFLUID N200, a naphthalene sulfonate based superplasticizer for concrete. When added to the cement-based screed mixture with a 1% to 1.5% by weight cement dose, MAPEFLUID N200 allowed a 17% to 25% water reduction depending on the concentration of additive.

MAPEFLUID N200 improves the mortar's workability while in a plastic state, increases its compressive strength and reduces its shrinkage while curing. In order to maintain the short time period required by the installer, the remaining 3.000 sq.m (32.30') of substrate was completed by using MAPECEM in the cement screed. MAPECEM is a special fast-setting hydraulic binder for the preparation of shrinkage controlled screeds. When mixed with graded aggregates and water, MAPECEM has the extraordinary capacity to dry and harden



*Mapecfluid N 200*



*Mapecem*

in just a few hours.

These characteristics and its very high mechanical strength allow the substrate to be ready for installation within only 24 hours. MAPECEM also saved considerable time in the organization and management of the job site while eliminating the long curing time usually required before installing the flooring over a traditional cement-based substrate.

All the substrates were installed with expansion joints every 6x6 cm (2.36") in order to weaken the substrate section. This also prevented possible crazing and damage to the screed caused by the dry shrinkage of the mud bed.

The installation was done after the screeds were ready for traffic and was completed by cutting 1/3 of the depth into the substrate.

*Setting the MAPECEM screed created a substrate which was ready for floor installation in a very short time. Cement-based screeds were initially added with the MAPEFLUID N200 superplasticizer.*





*An image of the check-in hall. The marble flooring makes these heavily trafficked rooms elegant and cozy.*



*Ultraplan*

*Leveling with ULTRAPLAN. A pump was used for the application.*



### **Leveling The Substrate In Less Time**

Despite the professional skills of the construction firm, in some areas of the substrate, particularly in the Arrival, Departure and restaurant areas, the difference in the substrate level was greater than the 2mm (0.08") measured with a 2m (6.56') straight edge as specified by the construction manager. To even out the differences between the levels, which in some cases reached a maximum thickness of 7mm (0.275"), an easy-to-apply, rapid-setting material was required. ULTRAPLAN, the fast-hardening, self-leveling compound, was chosen. Its fluid nature enabled 15.000 sq.m to be leveled in record time. The new surface was ready to be installed after only 4-5 hours. The perfect flatness of the substrates made it possible to

install materials with a minimum quantity of adhesive.

### **Floor And Wall Coverings**

Groupe 2000, the interior design firm in charge of the project, wanted to create an environment which was extremely functional, pleasant and comfortable. Special care was devoted to the interior decoration : the flooring in the Departure and Arrival areas and in the vertical communication passageways, Diamant and Saphir, were installed with a chamfered and calibrated red granite (60X60X2 cm) from Madagascar over a 40.000 sq.m surface. This granite is manufactured by Technostone. The flooring, with dimensions of 30X30X1 cm, was also installed over a 15.000 sq.m surface in the passageway connecting the main building with the boarding lounges.

10.000 square meters of Marbralys marble was installed inside the tunnel connecting the new terminal with the Topaze building. The heavy traffic and delicate marble required a special adhesive. This adhesive had to meet specific standards such as : high shear resistance, rapid drying and hardening to avoid slab deformations and a floor ready for foot traffic in the shortest time possible.

GRANIRAPID, a fast-setting adhesive system with rapid hydration, was chosen since it allows floors to be ready for grouting after three hours and is open to heavy traffic after 24 hours.

The 2mm wide grout joints were filled with ULTRACOLOR n°10, a rapid setting and hardening cement grout for use with 2 to 20 mm ceramic tile joints.

ULTRACOLOR was used since it is an easy to clean, color fast grout that will not promote efflorescence. In addition, floors can be ready for traffic three hours after installation. Finally, a green and violet carpet was installed in the



Three project stages : here below, mixing the two components of GRANIRAPID. At the center, installing the red granite from Madagascar (60X60X2 cm) with GRANIRAPID. At the bottom, after positioning, the granite slabs are tamped to achieve a proper adhesion of the back.

mezzanine and the waiting area in the Departure area .

Particular care was devoted to the floor and wall coverings in the rest rooms. A 20X20 cm single-fired tile manufactured by Appiani was installed on the walls with ADESILEX P25, a ready to use paste adhesive. The floors were set with GRANIRAPID and the grout joints were grouted with KERACOLOR, a Portland cement based grout.

An agglomerate marble by Silestone was used for the wall base boards. These base boards were installed with KERABOND+ISOLASTIC (KERALASTIC system in North America), a dry-set mortar system composed of a cement based adhesive for ceramic tiles modified with a latex additive to elasticize cement based adhesives.

### Only 26 Months To Fly

Despite a demanding time schedule, the airport was completed in just 26 months. Excellent results were obtained thanks to the team work of an experienced and trained crew. In addition, selection of the best installation products for the designated setting materials resulted in a remarkable saving of time and outstanding final results.



Granirapid



Adesilex P25



Kerabond+Isolastic



The technical data sheets for the products mentioned in this article are contained in Mapei binder No. 1 "Ceramic Tiles Adhesives" and No. 3 "Building Speciality Line"







Ultracolor



Keracolor

Several adhesives have been used to bond the ceramic tiles to the rest room floor and wall coverings : ADESILEX P25 and KERABOND+ISOLASTIC (KERALASTIC system in North America), ULTRACOLOR and KERACOLOR were used to grout the marble and the ceramic tiles



A detail of the hall connecting the departure area with the bus and train station

Below, a detail of the departure area



## TECHNICAL DATA

**PROJECT:** Zaventem national airport in Brussels, Belgium - 1<sup>st</sup> stage

**CONSTRUCTION PERIOD:** 1990-1994

**CONTRACTOR:** BATC (Brussels Airport Terminal Company), Zaventem

**INTERIOR DESIGNERS:** Groupe 2000 (Dirk Bontinck, Michel Jaspers, Henri Montois, W. Van Camperhout and L. Willox)

**CONSTRUCTION FIRM:** A.M.I.A.C. (Association Momentanée International Airport Contractors), Zaventem

**INDUSTRIAL SCREED AND COVERING COMPANY:** Miot & Bresciani, Brussels

**INSTALLER:** Technostone, La Spezia, Italy

**TOTAL COVERING SURFACE:** 125.000 sq.m.

**INSTALLATION MATERIAL:** red granite from Madagascar by Technostone ; reconstructed marble by Marbralys and Silestone ; Single-fired tiles by Appiani

### INSTALLATION PRODUCTS:

Substrates: MAPEFLUID N200 additive for concrete MAPECEM screed  
leveling : ULTRAPLAN  
adhesives : GRANIRAPID, ADESILEX P25 and KERABOND With ISOLASTIC  
grout : ULTRACOLOR n°10, KERACOLOR

# IN THE MUSEUMS OF THE VATICAN APOSTOLIC LIBRARY

INNOVATIVE SOLUTIONS REVITALIZE THE RELIGIOUS AND HISTORIC BEAUTY OF THE GALLERIES.

The galleries of the Vatican Apostolic Library were reopened to the public on January 28th 1995. The official opening was held on March 15th 1995, a very important date for Mapei.

Mapei was chosen to play an important role in the renovation of a large section of the corridor flooring leading to the twelve Sistine Halls. This 1700 square feet of floor space bears more than 15.000 visitors per day on their way to see the extraordinary collection of the Popes' books preserved there.

The restoration was made possible by Mapei, in collaboration with Floor Gres. Floor Gres is the ceramic company which is part of the Florim group located in Fioriano Modenese (Italy).

Mapei products provided the technical solution for a project that demanded modern materials and techniques while maintaining the historical ambiance.

The project was entrusted to the architect, Adalberto Dal Lago, who has worked on many important and prestigious projects using Mapei products.

The floor covering used for the restoration was Chromotech, a porcelain tile exclusively manufactured by Floor Gres.

This material is made from a mixture of powders treated with a special patented "double-loaded" technique, giving each tile a unique color and shape.

## Timing

Timing was one of the primary requirements for a successful realization of the project.

The objective was to minimize the amount of time that the public would be inconvenienced by the restoration.

PHOTO 1



*PHOTO 1*  
The old linoleum covering was in very bad conditions: notice the subsiding substrate

*PHOTO 2*  
The demolition of the old substrate and the elimination of the linoleum covering before the installation of the new floor

*PHOTO 3*  
Placing the polyethylene sheets: a necessary addition to separate the new screed from the existing sub-flooring

*PHOTO 4*  
Mapping the room: notice the mesh laid over the polyethylene sheet to strengthen the sub-floorings and to diffuse the weight of the floor covering

PHOTO 2



PHOTO 3





**PHOTO 5 and 6**  
The MAPECEM screed is pumped directly on the job-site while in a nearby area the product is being laid, thus speeding up the timing required



**PHOTO 5**

**PHOTO 4**



**PHOTO 6**



In the end, only forty days were needed to complete this restoration, an astonishing feat that would have impressed skilled workers of centuries past.

#### **Technical choices for floor preparation and installation**

The original flooring consisted of linoleum which protected a floor of grit, *seminato veneziano* (a traditional Venetian flooring) and cement frequently patched and worn thin by high traffic. After careful study, the decision was made to completely demolish the existing floors and old substrate to a thickness of between 4 and 15 cm (1.58 and 5.90 inches).

The antique cabinets which line the perimeter of the Galleries were not removed during the renovation due to time constraints.

These cabinets contain precious gifts that the Popes received from all around the world.

After protecting these cabinets, the demolition and removal of the old floor and substrate commenced.





PHOTO 7

PHOTO 8



A polyethylene sheet was placed and fitted to separate the sub-flooring from the tile installation surface to allow proper hydration of the MAPECEM and to protect against dampness. A mesh was then laid over the polyethylene to strengthen the sub-floorings and to diffuse the weight of the floor covering. MAPECEM, a special hydraulic binder for rapid drying screeds, was pumped to create a highly-resistant substrate. MAPECEM's fast-drying and setting qualities made it possible for several crews to work simultaneously: one team pouring and leveling, while another team installed the tile after just 4-5 hours.

GRANIRAPID adhesive, the two-component, fast-setting and drying adhesive system used for laying ceramic, natural stone, artificial stone and aggregate was used to install the tiles. In addition to its excellent bonding characteristics which also makes it suitable for non-absorbent surfaces, GRANIRAPID readied the Sistine's corridor for Vatican visitors in just three hours from laying. At the same time GRANIRAPID also helps resist aging particularly in this extremely high-load installation.

The tiles, which varied in both size and color, were placed at a distance of 3mm and the joints were subsequently filled with Manhattan gray ULTRACOLOR grout. ULTRACOLOR is a rapid-setting and hardening, shrink-free mixture suitable for use in joints from 2 to 25 mm.

This material can be used between ceramic tile, glass mosaic "cotto toscano", porcelain tile, natural stone and aggregates.



PHOTO 9



PHOTO 10



PHOTO 11



PHOTO 12



*PHOTO 7 and 8  
Installing the tiles  
with GRANIRAPID ;  
the floor can be  
installed after only a  
few hours from  
screeding and is ready  
for traffic after only 4  
hours*

*PHOTO 9 and 10  
Filling the joints with  
ULTRACOLOR.  
Cleaning can already  
be executed within 3-4  
hours after the  
application of  
GRANIRAPID*

*PHOTO 11 and 12  
Finishing the work by  
filling the expansion  
joints with  
MAPEFLEX PU21*

*PHOTO 13  
Setting the Papal seal  
required very special  
care because of its  
fragility*

ULTRACOLOR is free from the formation of efflorescence on the surface and can be ready for traffic within 3-4 hours after application.

The width of the remodeling made it necessary to install elastic joints in order to absorb the respective movements between tiles and substrate.

The joints were filled with an elastic compound with high abrasion resistant properties, MAPEFLEX PU21. MAPEFLEX PU21 is a two-component, self-leveling sealant with the same Manhattan gray color of ULTRACOLOR.

### Historical profile of the halls

The rooms which were restored were those on the right and left of the Sistine Hall in the gallery on the west side of the Belvedere Courtyard built by Pope Pius IV in 1565.

The rooms were the following: the First and the Second Paoline Room designed by Pope Paul V in 1611, the Alexandrine Room designed by Pope Alexander VIII in 1690, the Clementine Gallery designed by Pope Clement XII in 1732. Toward the Sistine Hall the rooms restored were the First and Second Sistine Hall designed by Pope Sixtus V, the Gallery of Urban VIII, and the Sacred

PHOTO 13





PHOTO 14



Museum designed by Pope Benedict XIV in 1756.

These rooms were built to hold and preserve the precious manuscripts and the numerous collections of books gathered by various Popes over the centuries.

At present, these valuable collections have been transferred to more suitable places for their conservation.

However the rooms remain an integral part of any visitor's tour of the Vatican Museum.

The artistic and religious creations of these rooms are that of a 16th century designer, Domenico Fontana. The

PHOTO 15

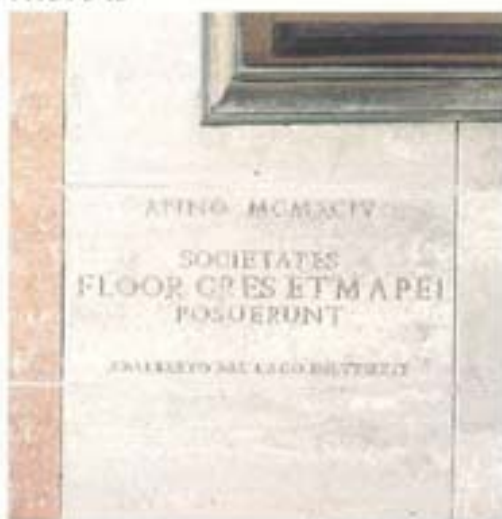


PHOTO 14  
A general view of the Halls. Only 40 days were needed from the beginning of the work to complete the restoration

PHOTO 15  
The slab in the picture was inserted in the new floor in memory of this important job



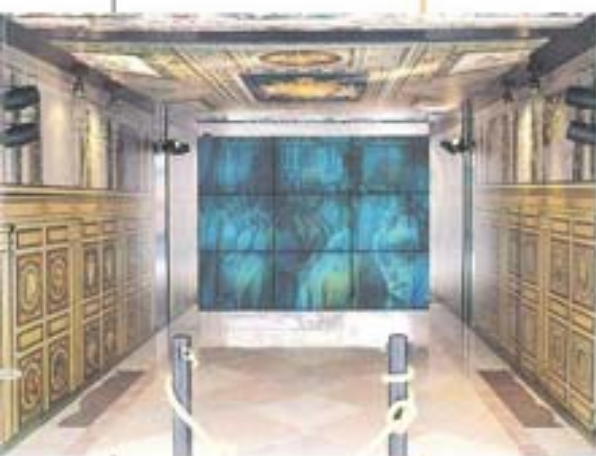


challenges faced by the restoration were not only structural and decorative, but it was essential to maintain the original appearance and designs of its creator. According to the architect, Dal Lago, "Modern design means exactly this: to interpret the past, in the light of the scientific and technological innovations of one's own time, whilst respecting the aesthetics and symbols of its originator." Mapei proudly helped restore The Sistine Chapel so that the entire world may enjoy this unique treasure in its original splendor for generations to come.

*The technical data sheets for the products mentioned in this article are contained in Mapei binder No. 1 "Ceramic Tiles Adhesives"*



*The monograph "Gallerie della Biblioteca Apostolica Vaticana. Restoration of the floor in the architectural space of the XVI century", available in 4 languages, was published as soon as the restoration of the floor was completed. A 14' entertaining video was as well shot with, as a main character, a worried Michelangelo, at first afraid of the intervention of the "moderns" then satisfied once he has seen the final result.*



Congratulations! Mapei's project, the "Vatican Library (Sistine Galleries)" in Rome, has been chosen to receive a Special Award of Merit in the Tile Promotion Board's Spectrum International competition for ceramic tile design, during "Coverings" exhibition - Orlando, USA (23-26 April)



#### TECHNICAL DATA

**PROJECT :** Galleries of the Vatican Apostolic Library

**YEAR OF FORMER INTERVENTION :** (linoleum installation) the fifties

**YEAR OF ACTUAL INTERVENTION :** December '94 - January '95

**SURFACE :** 1700 sq.m.

**DESIGNER :** arch. Adalberto Dal Lago - staff : arch. Gabriele Bonifacio, arch. Laura Cesari

**CONSTRUCTION SUPERVISOR :** Eng. Pier Carlo Cusianna

**TILE-SETTER :** Edil Pav by Sandro Sigismondi

**MASTER MASONS :** Achille Fratarcanselli, Marco Chiarlitti, Massimo Rotondi, Mauro Rotondi, Sergio Nardozi

**AGGREGATE SUPPLIER :** Marcoelli Gian Luca Edilizia

**FLOORING :** thin porcelain tiles "Chromtech" by Floor Gres

**INSTALLATION PRODUCTS :**  
MAPECEM screed  
GRANIRAPID adhesive  
ULTRACOLOR grout  
MAPEFLEX PU21 elastic joint



# A STRATEGIC PRESENCE

MAPEI IS THE ONLY NORTH AMERICAN COMPANY ABLE TO SERVE EVERY REGION OF THE CONTINENT. THIS ARTICLE REVIEWS THE FUTURE STRATEGIES AND GOALS OF MAPEI TO PRESERVE THE MARKET LEADERSHIP.



**M**apei is the leading company in North America for adhesives ceramic and natural stone, a prestigious result obtained in a few years thanks to an extremely efficient structure for research, production, technical and commercial assistance and to an entrepreneurial strategy that revealed to be successful. At present in North America, Mapei is present with two plants in Canada; the main and largest in North America, is situated in Laval, a suburb of Montreal, and a second in Vancouver. Mapei also has a warehouse outside of Toronto. In the U.S., Mapei has five plants in: Chicago - Illinois, South River - New Jersey, Fort Lauderdale - Florida, Garland - Texas, and in Phoenix - Arizona. A stocking warehouse is located in Anaheim -

California as Mapei Caribe is situated in San Juan, Puerto Rico. With plants strategically situated, Mapei is the only North American company to serve every region of the continent.

Concerning our laboratories we have two research labs in North America and a quality control lab in every plant. The main research lab is in Laval Canada, where 19 technicians specialize in polymer, organic adhesives, epoxy and polyurethane research.

Our lab in Garland - Texas, specializes in cement products research. We asked Nick Di Tempora, president of Mapei Incorporated (Canada) and Mapei Corporation (USA), few questions about the situation of the North American market, the current strategies and the future goals of Mapei.

**Q. : What is your role in Mapei North America ?**

**A. :** My title is that of President of both the Canadian company, Mapei Inc., and Mapei Corporation, the American company; my role is more of Chief Executive Officer, since I have the complete responsibility of the every day decisions of managing both companies. As we expand into both Central and South America I will also be

responsible for those markets.

**Q. : Is Mapei considered an Italian company operating in North America or a truly American company ?**

**A. :** That has probably been one of the oldest battles we have fought in North America. When we started the Canadian operation we were considered Italian. Six years later when we started in the U.S. we were considered Canadian, but the truth of the matter is that we have followed the wisdom of our chairman Dr. Giorgio Squinzi whose ideology is simply that if you want to do business in Canada you must be Canadian and if you want to do business in the U.S. you must be American.

To prove this point, with the growth we expect in 1997 we will probably reach 350 employees in Mapei Corporation and I am the only "foreigner" or at least not American born, but I have been living in North America for over 45 years. I must admit though that we do not hesitate to boast about our Italian heritage, and our ability to offer the best of both worlds, an American made product with a technical orientation from Italy.

**Q. : What is Mapei's strategy in North America ?**

**A. :** Our strategy is very simple, we must offer our customers an above average product, at a fair price, with the best possible service. Ultimately, I think this is what is going to make the difference, since this cycle of lower prices is going to "bottom out" and service will become increasingly important.

**Q. : Are your strategies for Canada, the U.S. and South America the same?**

**A. :** The business strategy is basically the same, but the way we sell and commercialize our product differs. The Canadian market is very mature and so





The drawing representing the branch offices of Mapei Inc. and Mapei Corp.

The new head office of Mapei Corp. in Garland (Texas)



Below, the managerial staff of the new plant in Garland together with Giorgio Squinzi and Nick Di Tempora

we have taken a defensive stance. In the U.S., where there is still a lot of growth potential we are more aggressive, whereas in Central and South America we are still determining the product mix and how to go about introducing these products, realizing that education will be one of the most important factors.

**Q. : What is the market share of Mapei Inc. and Mapei Corp. ?**

A. : Mapei Inc. has a 50 to 55 % of the Canadian market even though in some areas such as Montreal we probably have a 70% market share. Mapei Corp. has experienced exceptional growth and is expected to obtain 18% to 20 % of the U.S. market. So as you can see that there is still a lot of growing to do.

**Q. : What are some of the changes that have occurred for Mapei in North America ?**

A. : Our growth in North America has been our greatest challenge. We seem to outgrow or expand our facilities at a greater rate than planned. For one, we moved our American subsidiary from Chicago to Garland. There we constructed the largest manufacturing plant that we have in the U.S. which produces the complete line of U.S. products. We established a plant in Fort Lauderdale last May which was a major event. We are also planning the relocation of the Puerto Rico plant. In addition, the construction of our newest venture in Caracas, Venezuela, has begun and should be operational by November of this year. In Canada we opened a new full stocking warehouse in Vaughan, a suburb of Toronto to better serve the local customers. We also purchased an operation in Maskinonge, Quebec which produces a key raw material, that will enable us to not only to better control our activities, but it will also allow us to provide better products to our customers, which is our ultimate goal.

**Q. : How do you see the market both in Canada and the U.S. ?**

A. : In Canada as I mentioned before we are trying to protect our market share in ceramic adhesives. That is why seven years ago we began a second



division to serve the floor covering industry and three years ago, again, in an effort to grow more we introduced the construction line. And we are doing quite well even if the economic situation is not conducive to any growth. Now, we are looking at the potential in export business from Canada. Already about 30% of the Canadian production is exported to the U.S. In the United States the situation is quite different we have a much bigger market (possibly 10 times that of Canada) and we are growing at an unbelievable rate. This year after a 12 year presence in the American arena we are still growing at a rate of over 50 % above 1995. Since there is still a lot of work to do in the ceramics and floor covering area in the U.S. we haven't introduced our specialty construction line of products. The economic prospects in the U.S. are still quite good and the market should increase by 10-12 % this year. But a major part of our growth will come from taking business away from our competitors.

**Q. : How many plants, warehouses and laboratories do you have ?**

A. : We have two plants in Canada ; the largest in North America is situated in Laval, a suburb of Montreal, and a second in Vancouver. We also have a warehouse outside of Toronto. In the U.S. we have plants in Chicago, Ill., South River, New Jersey, Fort Lauderdale, Florida, Garland, Texas, Phoenix, Arizona and San Juan, Puerto Rico. We also have two stocking warehouse situated in Old







At left, on top, the plant in Fort Lauderdale, underneath, the one in Phoenix; here below, the plant of South River, near New York



Bridge, New Jersey and Anaheim, California. As you can see our plants are strategically situated making us the only North American company to serve every region of the continent.

As far as our laboratories are concerned we have two research labs in North America and a quality control lab at every plant.

The main research lab is in Laval Canada, where we have 19 technicians on staff who specialize in the polymer, organic adhesives, epoxy and polyurethane research. Our second lab in Garland, Texas, specializes in cement products research.

**Q. : Who are your competitors ?**

A. : That is a difficult question to answer, because I like to think that we are the competition. I would like to think that we set the standards in our industry, through the quality of our products, the service we provide and the image we project. I must admit though that there are some competitor companies that are sharp and aggressive. We are probably in the middle of the top three, between Customs and Laticrete, but not for long. We are number one in the world, number one in North America, and we are certainly not going to remain number two in the U.S.. This will change soon.

**Q. : Which market is more critical to your growth ?**

A. : The most important market place for us in the near future is of course the American market, but we cannot lose sight of the South American potential, and of course the Mexican market is also

quite attractive and accessible.

And that is where our efforts will be dedicated in the medium term. We already have made some in road in accomplishing that goal.

There is not a Caribbean island, Central American country or country in the northern part of South America where we do not have at least two distributors.

**Q. : Do you supply to the home center market ?**

A. : Yes of course, home centers are really growing the flooring business, not only by taking business away from independent distributors, but also by doing what they do best, which is to serve the consumer.

These centers are, in fact, in a position to promote the flooring market to a larger segment of the population and are succeeding in obtaining better results due to their consumer focus. A recent study revealed that a home center satisfied the needs of a customer 75% of the times versus 25% of the time with a flooring distributor.

Presently we own a good portion of this home center business and this has become one of the fastest growing division of our sales.

**Q. : What about the I.S.O. 9001 program ?**

A. : I am happy and proud to report that as of the printing of this article both of our plants and our warehouse in Canada will have been accredited. We have already started to plan the integration of this program in our U.S. plants.



The plant of Elk Grove Village, a few kilometers away from Chicago







Company information are normally available in English for the whole North America, in Spanish for Central and South America and in French for the Canadian market of Quebec

In the picture on the side, an example of display of Mapei products by North American distributors.

Let's now ask Giorgio Squinzi, sole administrator of the Mapei Group, a few questions in order to understand how Mapei was able to conquer the North American market.



**When did Mapei start selling in the North American market and how?**

Mapei started doing business in the American market during the seventies by sporadically selling to local distributors interested in Mapei products. As a matter of fact, the first significant sale of Mapei products took place during the 1976 Olympics in Montreal when large amounts of adhesives for installing rubber flooring and tracks, were supplied through a Canadian distributor. By working on this project we saw the opportunity to introduce products for ceramic installation into the market. From 1977-1978 a market survey was conducted. At the end of 1978, since it was not economical to sell European based products in the Canadian market, we opened a production plant in Canada. The plant in Laval, which is close to Montreal, was Mapei's first production plant in North American and resulted in wide-spread growth.

**What have been the reasons?**

We entered into the North America market in the seventies as part of our globalization strategy and



recognizing the tremendous growth opportunities that existed within the ceramic industry there. In 1980 the coverage of ceramic tiles in North America was around 50 million sq.m with a 0.2 sq.m per person, while in Europe values were 10-15 times higher. The ceramic market has experienced solid growth, although it has been below our expectations.

Today the coverage in North America has reached nearly 0.6-0.7 sq.m per person. In addition our international strategic plans took into consideration that the North American market is also extremely important for resilient and vinyl floors. Mapei has developed a niche in this market with a highly

specialized line of products. During the last few years Mapei has obtained particularly brilliant results with this segment.

**As a subsidiary of an Italian company what is your strategy? Has it changed since it is now a North American company?**

From the very beginning our goal has been to be a North American company. Our first operation was established in Laval Canada, on the outskirts of Montreal. This has always been the philosophy of Mapei: to be a company with an international view, while adapting as much as possible to the local







On the left the plant of Vancouver and here below a few images of the plant and of the laboratory in Laval

business practices. This is demonstrated by our employment of local personnel in our foreign firms, instead of permanently transferring personnel from Italy. An exception may be made if there are specific problems or if our subsidiary companies require assistance from the head office. In Canada, Mapei is recognized as a Canadian company, while only partially as an Italian company. This perception has carried over into the U.S., but it is slowly diminishing since Mapei's distribution system covers most of the U.S. market now through its 6 U.S. plants. After the original Canadian plant was established in 1984, a second plant was opened in Phoenix, Arizona. This location was chosen because, together with California, it is a particularly promising market for the ceramic business. In 1986, a production facility was opened on the outskirts of Chicago, in Elk Grove Village; an area where Mapei products were previously supplied through Canada. During the following years Mapei's production and distribution structure progressively increased. First with the acquisition of three existing productive units in Dallas, Atlanta and New Jersey. Then more recently, with the transfer of the Mapei Corp. office from Chicago to Garland (Texas) and the creation of a new plant with higher production capacity. We also



### Summit Club 1997

Orlando's trade show "Coverings" has been taken as a chance to celebrate the winners of the yearly award "Summit club". This year Mapei gathered over 680 customers and friends at the MGM Studios. Set by Mapei Corp., the "Summit Club" award calls together the best retailers of Mapei products, who met or exceeded the sale target. For the sixth year nonstop, the first prize has been awarded to Mid-America Tile in Elk Grove Village, Illinois (in the picture, Tom Kotel, President of Mid-America Tile). Other retailers who distinguished themselves in 1996 are:



Mid-America Tile Company	Elk Grove Village, IL	Jaecle Wholesale	Madison, WI
Gulf Tile Distributors	Tampa, FL	Morris Tile Distributing Co.	Tuxedo, MD
Standard Tile Distributors	New Haven, CT	Radio Distributing Co.	Taylor, MI
Boston Tile Company	Dedham, MA	Villeray & Boch	Dallas, TX
Best Tile Distributors	Wexford, PA	Design Materials, Inc.	Denver, CO
Flooring Distributors	St. Louis, MO	Hoboken Floors	Stoughton, MA
American Marazzi Tile	Dallas, TX	Rubin Brothers	Orlando, FL
Contempo Ceramic Tile	Salt Lake City, UT	Distinctive Tile	Allamonte Springs, FL
DeMarco Tile	Naples, FL	Pembrake Tile & Stone	Bermuda
Minnesota Tile Sketchbook	Brooklyn Center, MN	Ceramic (Trinidad) Limited	Trinidad, West Indies
Arley Wholesale	Scranton, PA	Allatecnica S.A.	Santa fe de Bogota, Columbia





moved from Atlanta to Fort Lauderdale (Florida) to hone in on the larger market in South Florida. This has progressed together with several continuous improvements in Mapei's North American productive and distribution system.

**This is a whirl of events: in America is it easier to move, enlarge, open and close productive units compared to Italy?**

Yes, it is easier. Since 1989, we have been waiting for permission to increase the size of our plant in Robbiano di Mediglia and since 1992 the Latina request has met resistance as well. It is important to underline that the North American Mapei is totally self-sufficient from the Italian headquarters, although they are still

connected financially and technically. The exchange of information and experiences occurs daily.

**What do you expect to happen in the future for North America?**

Mapei has experienced tremendous growth in North America within the last seventeen years. The 1996 data confirms this growth as well as Mapei's leading market share. We are therefore engaged and expect to continue heading in this direction; preserving our leadership and strengthening it. We expect to be very successful by the acquisition of the North American Company (see details here below).

*The West-Chicago plant*



*The Italian and North American staff*



*Visiting the production unit: the packaging of DIY products*



## North American ADHESIVES

### Mapei Corp. acquires North American Adhesives

On August 28th, 1996, Mapei Corp. acquired North American Adhesives from Color Tile Inc. Mapei has confirmed that the North American Adhesives' brand name and products will be preserved. There will also be an improvement in customer service for both companies. The plant, consists of a 45,000 sq.m surface of which 15,000 sq.m. consists of buildings. Located in West Chicago (Illinois), North American Adhesives manufactures a wide range of adhesives for the ceramic, resilient and the DIY market, thus adding important production capacity to the Mapei Group. With this acquisition, the number of manufacturing plants in North America, has increased to 9 and it confirms Mapei's leadership in the North American market for the manufacturing of adhesives for ceramic and stone.





# ISO CERTIFICATION

A LOOK AT THE MAPEI QUALITY SYSTEM TWO YEARS LATER.

by Nazario Borghetti



This trademark identifies the **MAPEI QUALITY SYSTEM**



This trademark identifies the **VINAVIL S.p.A. QUALITY SYSTEM**



This trademark identifies the **MAPEI INC. QUALITY SYSTEM SERVICE** issued by QMI

On the 10th of February 1995 Certichim, the Quality Certification Institute, member of the European network Eqnet, bestowed upon Mapei the Quality System Certificate according to ISO 9001/EN 29001 standards for "research, development, production, trading and assistance to customers of adhesives and chemical products for building and industry".

Two years later we can look at the system and point out the main effects owed to the introduction of Mapei Quality System. First, we must add, that inside the Mapei Group, two more divisions have been certified: Vinavil in December 1995 and Mapei Inc. (Canada) in August 1996. Vinavil and Mapei

Company	Standard	Board	Date	Note
<b>MAPEI Italy</b> (Head office, Mediglia, Latina)	ISO 9001	Certichim	02.95	Referent for other extensions of Mapei in Europe
<b>VINAVIL</b> (Head office, Villadossola, Ravenna)	ISO 9001	Certichim	12.95	
<b>MAPEI Inc. (Canada)</b> (Head office, Vancouver, Toronto)	ISO 9001	QMI	08.96	Referent for other extensions of Mapei in Europe

Canada's certifications confirmed, the validity of the Mapei Quality System.

The effects so far perceived are outlined as follows:

- improved control by the direction and the responsible staff on the company's activities thanks to improved information and data circulation
- improved comprehension and communication among the different functions when dealing with and solving problems
- remarkable reduction of non-conformities in production and effective solutions to the problems reported by the customers

## The Mapei Quality System

The Quality System carried out by Mapei interacts, with suppliers and customers. They are the real critics of the products and services supplied. The result in installing tiles or in a repair or restoration, is the sum of the systems parts: suppliers, laboratory technicians, production, sales, technical assistance, carriers, distributors, applicators/layers, and so on. Each is part of the process starting from the raw material to the





## ISO 9001 A worldwide prestigious certificate

### 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
- Systematic control to ensure conformity with the Quality System and with the ISO 9001 standards.

delivery/acceptance of the floor/wall covering or building to the final customer. If one single function does not adequately perform its work, the final result, and the professional care, are compromised. The strength of the chain depends on the weakest link. In order to ensure the quality, it is necessary that each operator feels responsible for the quality of his work. The scheme on this page represents the structure and the activities involved.

### “Products” of the Mapei Quality System

The activities carried out in the Mapei Quality System aim to supply “Products” composed of :

- high level innovative products to ensure conformity with the specifications and to always satisfy the needs of the customers and respect the standards
- information, suggestions and quick answers from competent technicians for the solutions to the problems on the job-site
- technical data sheets, information and data obtained and verified in the Mapei laboratories
- training courses for dealers to learn the correct use of Mapei products
- technical publications, specialized articles, and sponsorship of cultural events (meetings, restorations).





A view of Venice by Herzog (Mediamerica Magazine)

# The majolica flooring in Venice

ANALYTICAL STUDIES REVEAL THAT THE TILES IN THE SAN SEBASTIANO CHURCH IN VENICE DATE BACK TO 1510.

The floor in the Church of San Sebastiano is a rare example of the use of Majolica flooring in a place of worship in Venice. Most historians agree that the tiles originate in the town of Faenza. Some of the tiles bear the date of 1510, but it is not known who is responsible for producing the tiles. During the recent restoration of the floor, it was possible to obtain information about the technique and composition of the tiles through a laboratory analysis. The main objective of the analysis was to discover the true origin and creator of these tiles and eliminate the controversy surrounding their creator.

The principle analytical techniques used were the X-ray fluorescence (XRF), Scanning Electron Microscope (SEMEDS) and X-ray Diffraction (XRD) methods. The results gave rise to a series of doubts that the tiles originated in Faenza and suggested instead a second theory that the tiles may have been produced by non Venetian tile artisans using local raw materials.

## Question : Is The Majolica Flooring From Faenza Or Venice ?

The floor in the Lando Chapel of the Church of San Sebastiano in Venice is considered one of the most representative examples of Majolica tile flooring dating back to the 16th century. The



Ph: Paolo Alberti





varying designs and the simple, yet skillful use of colors has always sparked the interest and curiosity of art scholars and historians.

The floor consists of about 320 tiles that measure about 15 cm on each side as shown in the photographs on these pages. Each

tile contains a unique border design which when combined in a set of four tiles, forms a daisy and an overall design of various subjects (grotesque shapes, animals, flowers, fruits, castles etc.). One tile in particular contains a scroll with the date "1510" painted on it. In-depth analysis of the iconographic collection and the interpretations of the various inscriptions have led to a number of hypothesis regarding the origin of the work. However, historians still have not formed a unanimous opinion. The most reliable theories regarding the origin of the floor are those that favor Faenza or Venice.



tiles were removed, they were de-salted by washing them extensively in distilled water. This action was required due to the high concentrations of soluble salts present in each tile, mainly sodium chloride, with an estimated 50 g of salt for each tile.

Thus a formidable opportunity arose to study the technological nature of the tiles in question since it was possible to obtain very representative samples of parts which were otherwise inaccessible. This type of study could make a substantial contribution to the general knowledge of the artistic design and provide a solution to the still unanswered question regarding the tile's origin.

### The Analysis : Materials And Methods

The materials to be analyzed were sampled from tiles which had already been washed with distilled water and favored fragments which had already detached themselves from the walls or were in the process of detachment. The criteria used for the sample were the chromatic and decorative variations of the glazed surface, the macroscopic appearance of the tile body and the location of the tiles on the floor. Naturally, the most frequent stylistic patterns were those most represented in the samples.

Sixteen tile body samples were taken. The numerical code that identifies those samples corresponds to the numbers given by restorers to each floor element in the process of being removed. The most numerous group (18, 25, 98, 155, 270, 287, 294) relates to a frame with petals with various subjects (instruments, animals, various objects). In particular, tile 18 has glaze shrinkage defects, while tile 270 has a red tile body that is different from the other six, which tend to be yellow. A second group consists of samples 59, 160 and 308 which have the same type of border design. However, the first one has a very dense and bright glaze compared to the other two which differ in terms of their central design and their location within the flooring. The remaining samples cannot be grouped, since they have different types of designs.

In order to study the coatings, a number of surface samples were taken, particularly from the areas with gaps or portions which had already detached themselves from the ceramic structure.



*The scanning electron microscope from Mapei Research Laboratories, besides being one of the fundamental tools for the development and the control of Mapei products, is used in partnership with other organizations for the protection and preservation of artistic heritage*

Pesaro recently emerged as another possible location based upon the presence of some characters which are typical of the Umbria-Marches ceramic tradition.

The Venetian Artistic and Historical Heritage Service was responsible for the restoration and preservation of the Majolica flooring in the Church of San Sebastiano. In order to carry out such a restoration, project management decided to remove the flooring to make consolidation activities easier. After the





Only four tiles were removed in the process along with a few fragments, but they were sufficient to represent the four basic tones. The tile bodies were studied by calculating their chemical composition by means of X-ray fluorescence (XRF) while the mineral composition was determined through diffractometry (XRD). 0.5 g of the particles from the sample were pressed onto a boric acid base to obtain a tablet that could be used for all types of analysis.

After encasing the fragments in polyester resin, the coatings were studied through observation in a reflected light and scanned through an electron optical microscope (SEM-EDS). This block of resin was cut perpendicular to the exterior surface and then polished. The same sections were used to confirm the results between what was observed under the optical microscope and the analytical information obtained from the SEM-EDS analysis.

### The Research : Chemical And Mineralogical Composition Of The Tile Bodies

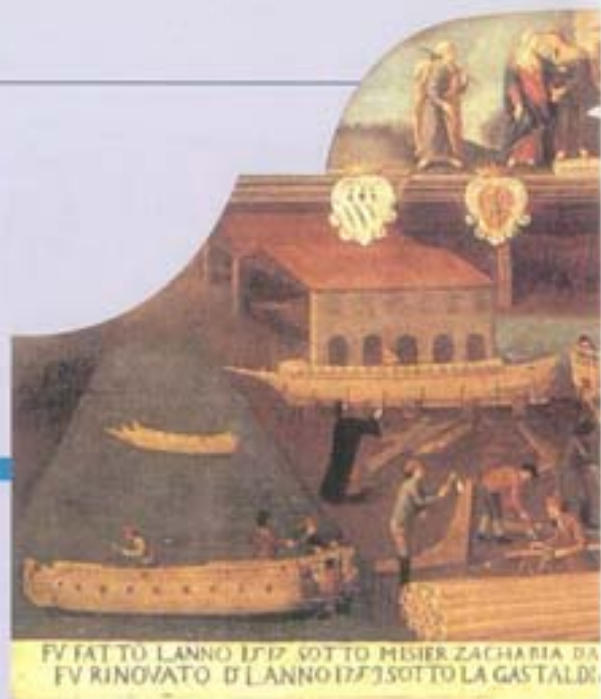
Research revealed that the tiles transformed themselves considerably over time since the tile weight had decreased significantly; tile weights varied from 5% to more than 12%. The reason for this is that the tiles may have required a part of the volatile components in the tile which are eliminated with firing or it could be that the heat treatment was not sufficient to completely eliminate the water contained in the clay minerals and the carbon dioxide of the carbonates. The thermal analysis performed on some representative samples clearly demonstrated that the weight loss is due mainly to the carbon dioxide resulting from the decomposition of calcite. The water which was present on the tiles was

the result of the extended exposure of the tiles to humidity at the site and not due to the tile washing.

The chemical compositions purified from the contents of the material on the exterior of the tile body indicate that the values are quite uniform. The only sample that does not fit well into the general composition scenario is no. 18, since its magnesium content is too high and the titanium and iron concentrations are too low compared to the other samples. Cautiously disregarding this sample, the average composition and the standard deviation of the other fifteen bodies clearly reveal the homogeneity of the group. Therefore, this is a reliable basis for comparisons with other more or less contemporary products from other Italian areas. The results of the diffractometric analysis on the samples indicate that the compositions are particularly rich in quartz and calcite. Thanks to the simultaneous presence of diopside, gehlenite and (anorthitic) plagioclase, it is estimated that the firing temperature was around 900-950 °C.

### The Results : Examining The Glaze

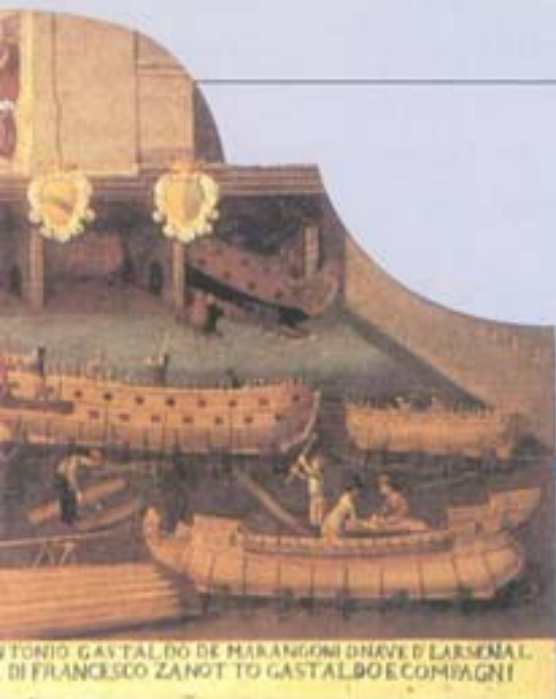
The tile bodies are covered with a white glaze whose thickness varies from 250 to 800 µm and they also include some uniformly distributed gas bubbles with diameters of just a few millimeters. The SEM microphotography in back scattering (Figs. 2-3) indicates the presence of compound elements with a different atomic number such that the darker areas correspond to elements with a low atomic number and vice versa. For this reason, the ceramic body, which consists only of light elements, has a uniform darkness, while the decoration and the transparent glaze have a uniform lightness because they contain lead.



FV FAT TO LANNO 1717 SOTTO MISIER ZACHARIA DA  
FV RINOVATO D'LANNO 1773 SOTTO LA GASTALDI.

Photos 1-2-3  
Optical microscope stratigraphic sections of the decorations (at left) and SEM microphotography in back scattering (at right).  
The pictures were taken in Mapei R&D Laboratories.  
The tiles shown are some of those examined by the analysis





A drawing of the XVI century showing the Arsenal in Venice (Mediterranean Magazine)

### Conclusion : Venetian Majolica Tile Painted By Artists From Faenza

The materials of the Lando floor have an average chemical composition that clearly indicate that the same raw material was used. The mineralogical composition and the uniformity of the samples show a firing temperature ranging from 900-950°C. Therefore, this group can be used as a reference to compare with more or less contemporary products from other Italian areas with similar characteristics. The comparison with the Faenza findings

provides only one possible interpretation: it is rather improbable that the tiles in the Lando floor were produced with the raw materials that are typical of the Faenza products. The hypothesis regarding the use of raw materials from the Marche, also appears to be rather unlikely, though this is uncertain, due to the limited amount of data available. The rather poor quality of the glaze on the tiles in the Lando Floor agrees with this theory. It seems more probable that raw material from the Venice area was used and that tile artisans from Faenza or Pesaro were commissioned to design tiles for the San Sebastiano floor like those produced in their original artisan workshops.

Photo 1

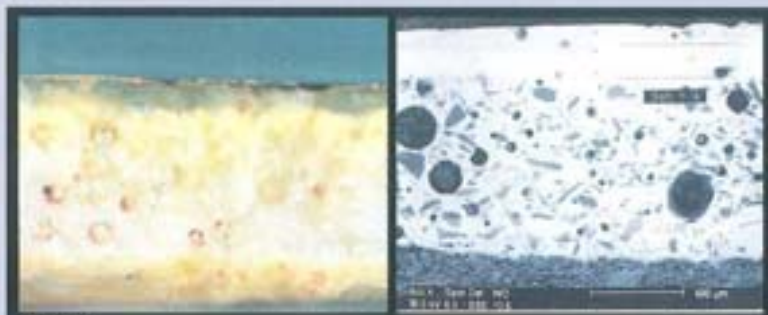


Photo 2



Photo 3



*Analysis conducted by Bruno Fabbri of the IRTEC-CNR, Faenza ; Vasco Fassina from the Artistic and Historical Heritage Service Of Venice ; Andrea Rattazzi from the Cesare Gnudi Foundation, Bologna ; Davide Salvioni from Mapei, Milano.*

*The article was taken from the report "The Majolica flooring of San Sebastiano in Venice ; an attempt at attribution by means of its composition and technology". The report was presented at the IV Conference of the European Ceramic Society (E. Cer. S.) held in Riccione from October 2 to 6 last year. The original English text is reported in the acts of the Conference published by the Faenza Editrice Editorial Group (39-546-663488)*





# EXTERIOR CERAMIC TILE CLADDING

## ESSENTIALS AND FLEXIBLE (ELASTIC) LATEX-CEMENT MORTARS

by Louis H. Couillard

Following a recent series of seminars held in three major Canadian cities on the exceptional aesthetic and functional contribution of ceramic tiles in today's modern computer-aided-designed building constructions, the Italian trade commission, on behalf of Assopiastrelle, circulated a questionnaire survey amongst the attendees inviting them to state, by order of priority, which particular tile installation subject they considered, in their opinion, to be of primary interest to the building professional and owners community. Surprisingly enough - and yet, on second thought, maybe not so surprisingly - the vast majority of the architects form architects designs, developers, owners and builder eagerly requested detailed information and guidelines for the planning, design and construction of exterior ceramic tile cladding. It would be pretentious to believe that all the intricacies of such a complex subject can be addressed in a single and relatively short editorial. That is not the intent of this article, the scope of which, therefore, will be limited to a general overview of some of the most common factors and building components that may influence the ultimate performance of the exterior cladding system.

### A Worldwide Phenomenon

In addition to its aesthetic advantages, which have been recognized since two and half millennia, ceramic tile is also a safe and functional cladding material. Many architectural landmarks featuring exterior tile cladding have, in fact, generated legitimate pride in their respective environments around the world, mainly because of:

1. Good engineering and carefully planned design,
2. Proper selection of quality materials, and
3. Conscientious execution by experienced installers. Among the finest and most outstanding examples of such successful installations are Australia's Sydney Opera

**Figure 1**  
**Exterior Tile Selection and Installation**  
*According to the french C.P.T. 1988 (Part 2) Standard, - Table 3*

Surface of tiles/cm <sup>2</sup>	S<100		100<S<300		300<S<900	
	W<30	30<W<40	W<30	30<W<40	W<30	30<W<40
Weight of tiles (kg/m <sup>2</sup> )	W<30	30<W<40	W<30	30<W<40	W<30	30<W<40
Maximum height allowed	No limitation			Limitation up to 28 m		
Floating	YES	YES	NO	NO	NO	NO
Floating and buttering	YES	YES	YES	YES	YES	YES

\* With latex-added 2 component mortar systems up to 1000 cm<sup>2</sup>

**Figure 2**

<b>DIFFERENTIAL MOVEMENT</b>	<b>CEMENT-BASED MORTARS</b>
0.1 mm	non-modified dry-set
0.1 - 0.2 mm	dry polymer-modified
0.2 - 0.3 mm	normal latex-added
0.7 - 0.8 mm	elastic latex-added

House; Switzerland's Rolex headquarters, Bern; France's "La Part Dieu" railway station/commercial center, Lyons, and Italy's legions of world-famous tile-clad landmarks, including Milan's Rainbow Tower, a brilliant, colorfully renovated water tower designed by Studio Original Designers 6R5, are among the most vivid contemporary witnesses to ceramic tile's superior values. In the United States, the more recently completed "H-Wing" addition to the University of Washington's Health Center in Seattle features a modern tile-clad concrete panel project designed by TRA Architects of Seattle. Furthermore, in 1991 alone, more than 3.750.000 square meters of ceramic wall tiles were used for exterior cladding in Italy.





Esmalglass - Sassuolo - Italy



D.O.T. Direction Operationelle Telecom - Toulouse - France



La Part Dieu - Lyon - France

Some of the main realizations accomplished with Mapei's products as regards exterior ceramic cladding

Figure 3

SIZES OF TILE		LINEAR CHANGE IN SIZE
60 cm x 60 cm	$= 8 \cdot 10^{-6} \cdot ^\circ\text{C}^{-1} \cdot 60^\circ\text{C} \cdot 6 \cdot 10^2 \text{ mm}$	0.288 mm
40 cm x 40 cm	$= 8 \cdot 10^{-6} \cdot ^\circ\text{C}^{-1} \cdot 60^\circ\text{C} \cdot 4 \cdot 10^2 \text{ mm}$	0.192 mm
30 cm x 30 cm	$= 8 \cdot 10^{-6} \cdot ^\circ\text{C}^{-1} \cdot 60^\circ\text{C} \cdot 3 \cdot 10^2 \text{ mm}$	0.144 mm
20 cm x 20 cm	$= 8 \cdot 10^{-6} \cdot ^\circ\text{C}^{-1} \cdot 60^\circ\text{C} \cdot 2 \cdot 10^2 \text{ mm}$	0.096 mm
15 cm x 15 cm	$= 8 \cdot 10^{-6} \cdot ^\circ\text{C}^{-1} \cdot 60^\circ\text{C} \cdot 1.5 \cdot 10^2 \text{ mm}$	0.072 mm
10 cm x 10 cm	$= 8 \cdot 10^{-6} \cdot ^\circ\text{C}^{-1} \cdot 60^\circ\text{C} \cdot 1 \cdot 10^2 \text{ mm}$	0.048 mm

- Geographical location and orientation
- Color of the tiles

This is why invariably, in each of the current standards, so much emphasis is laid upon:

- Substrate preparation
- Movement and isolation joint requirements
- Type and size of tile
- The use of flexible (elastic) mortars

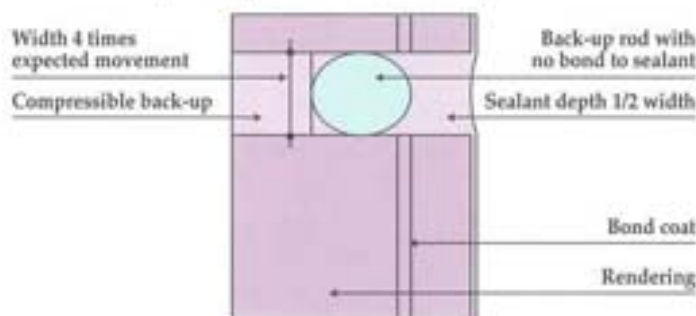
#### Substrate preparation.

In most cases, exterior tiles are set piece by piece on the site by experienced installers over cementitious renderings and cast concrete. The age and condition of the structural (or cast) concrete play important roles in the performance of the entire tile system. Despite a widespread popular belief, concrete is not static. On the contrary, it is subject to important shrinkage movement during the initial stage of its hydration process. The amount of shrinkage that occurs will become negligible in time, but it remains critical during the first two years. Consequently, when building an exterior cladding, the structural concrete must be at least three months old (the German code of practice even requires six months) to reach an acceptable shrinkage stability before tile can be safely applied. An additional three weeks' cure must be allowed when a cement rendering up to 2" (50 mm) thick is applied between the structural concrete and the adhesive bond coat. Both structural concrete and rendering must be properly engineered, solid, and free of shrinkage and movement cracks. To provide a good mechanical anchorage between the concrete, rendering and bond coats, all in-between surfaces - in addition to having a textured finish - must be clean, dustless, and free of any oil, wax, form release agent, or other substance liable to prevent or reduce adhesion. Traditional formwork used for concrete construction tends to leave a smooth finish with a film of release agent on the surface of the concrete, preventing a good mechanical bond from being achieved. To overcome this universal problem, the Japanese recently patented an

Figure 4

### Movement joints/vertical & horizontal

Joint Design Essentials TCA Detail EJ171-93



EXTERIOR - maximum spacing 3.5 m for joints 10 mm wide  
5 m for joints 13 mm wide  
(may vary depending on the geographical location)

#### Fundamentals: Good Engineering and Carefully Planned Design

Until unified international ISO standards are established, finalized, and adopted by all participating countries, various local standards and codes of practice are being enforced in the world. What is interesting, however, is that despite a very few details, all standards are unanimous in drawing special attention to the differential movements that take place between the ceramic tile surface and the substrate due to several thermal effects. These effects may individually and collectively act to varying degrees on the tile cladding, depending on:

- Solar exposure





Chamber of Commerce - Sesto San Giovanni - Italy



Directional and Commercial Building - Prato - Italy



Gaivotas do Tejo - Lisbon - Portugal

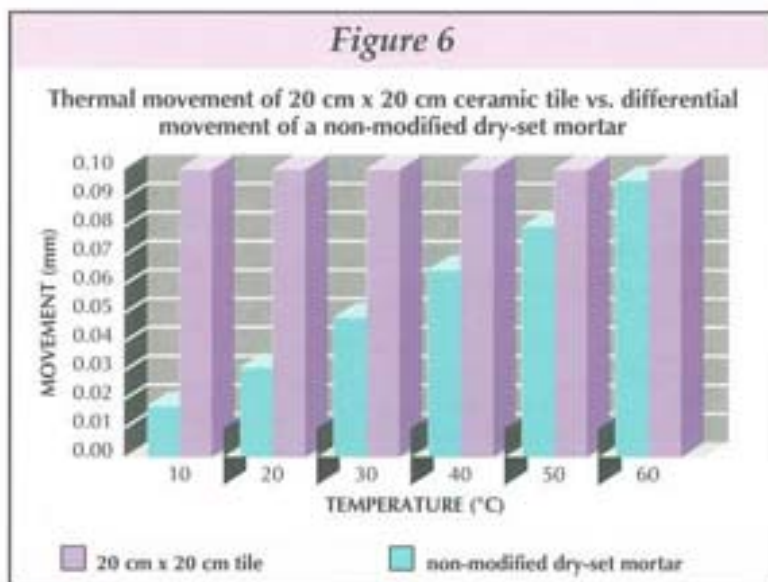
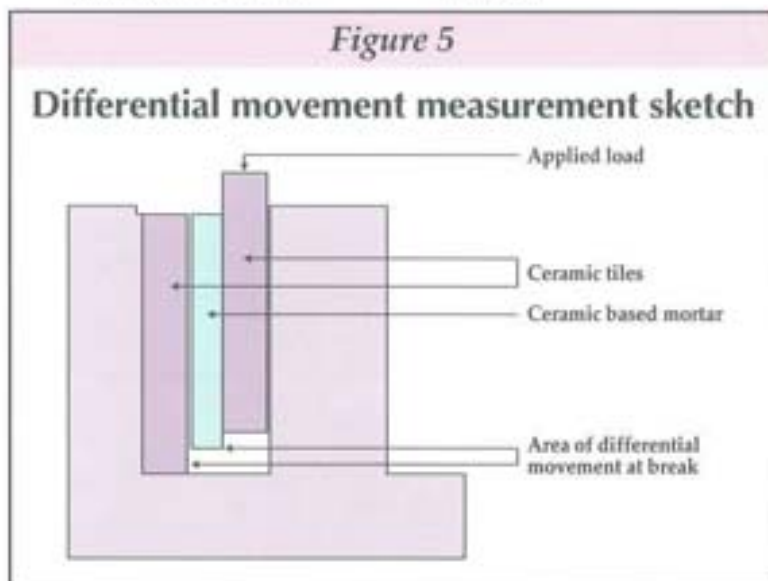
ingenious formwork system which simply consists of stapling or otherwise fastening a clean "blister pack" polyethylene layer over the entire contact face of the plywood form before pouring and vibrating the concrete in place. Because of the nature of the polyethylene, the forms are easily removed without damage to the hardened concrete, and the "blisters" provide a "honeycomb" texture and therefore a better mechanical bonding surface. Finally, the ultimate substrate surface must be plumb and true so that when an 8' 0"-long straight-edge is placed on any part of the surface, it does not show any gap exceeding 1/8" deep between contact points.

**Movement and isolation joints.**

Elastomeric isolation and movement joints must always be specified and installed in all corners, around windows, doors, openings and balconies, and at the meeting lines between two substrates of differing nature and composition (see Fig.13). Finally, exterior tilework must be divided into individual superficial units not exceeding 130 to 140 square feet (12 to 13 square meters) each. The Tile Council of America's Joint Design Essentials Detail EJ-171, on page 19 of the current TCA Handbook for Ceramic Tile Installation, is very specific when it comes to maxim spacing intervals between movement joints and minimum joint width. It also provides a comprehensive construction detail which shows a clean separation in the entire depth of the tile bond coat and rendering assembly, as well as the recommended depth of the sealant itself, to allow free movement and proper stress relief.

**Proper Selection of Quality Materials**

**Tile.** Today's ceramic technology has made completely vitrified frost-resistant tiles current production items in a wide spectrum of ever increasing sizes up to 24" x 24" (60 x 60 cm). Many of these homogeneous tiles have an extremely low porosity allowing less than 0.05 % water absorption (by



weight), and are offered either polished or unpolished in a complete range of colors, from sparkling whites and pastels to the warmest and darkest shades of colors, including black.

**•Tile Color.** To minimize direct thermal dynamic effects that can work against the tile system, it is always preferable to select a white pastel color tile in conjunction with a flexible (elastic) liquid added two-component latex portland cement mortar system. Black and dark colors attract and store a greater amount of solar energy, which translates into heat and, consequently, a greater thermal expansion of the exposed tile surface. Therefore, whenever design allows, it is preferable to select light-colored, pastel or white tiles.





Torre Arcobaleno  
Milan - Italy



Residential Building - Riccione  
Italy



Residential district - Milan -  
Italy

Figure 7

Thermal movement of 20 cm x 20 cm ceramic tile vs. differential movement of a normal latex Portland cement mortar

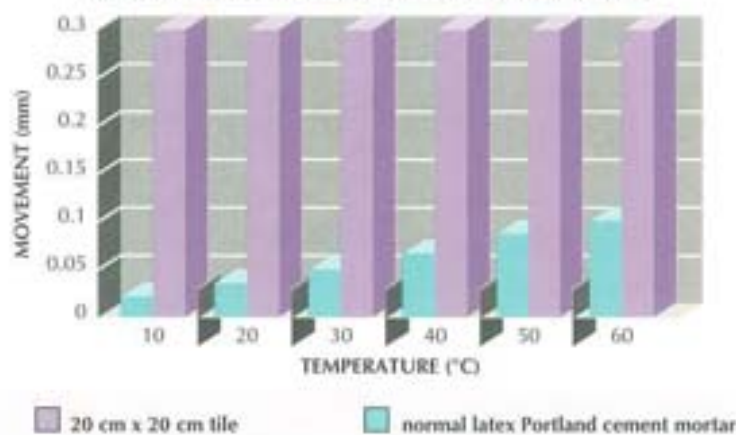
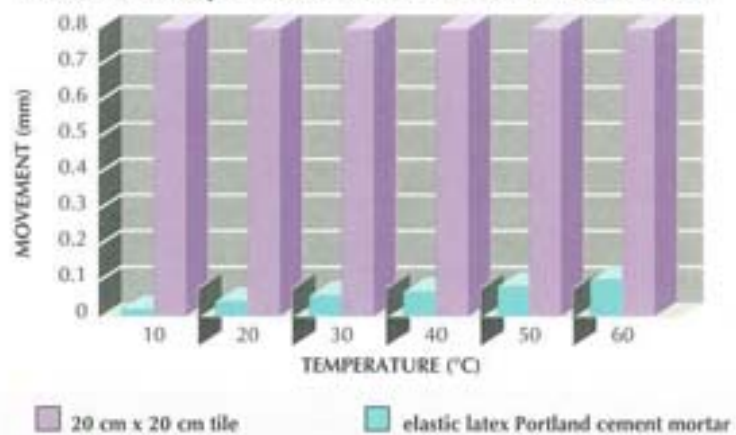


Figure 8

Thermal movement of 20 cm x 20 cm ceramic tile vs. differential movement of a liquid-added elastic latex Portland cement mortar



• **Tile size and weight.** When selecting the mortar and deciding on the best installation technique, thorough consideration must be given to tile size and unit weights. An interesting guideline is proposed in the French C.P.T. 1988 (Part Two), Standard Table 3 (Fig. 1). It stipulates that any tile unit greater than 100 cm<sup>2</sup> (for example, a 4" x 4" [10 x 10 cm] tile) must be installed by the floating and back-buttering method, and also that tile units larger than 900 cm<sup>2</sup>, up to 1,600 cm<sup>2</sup>, must be installed with a liquid-added two-component latex portland cement mortar. Yet, new ultra-modern ceramic extrusion and firing technology now allows certain tile manufacturers to offer some extruded, completely impervious tiles in

sizes as large as 32" x 48" (80 x 120 cm).

• **Setting mortars.** This development has forced setting materials manufacturers to develop new and advanced latex portland cement mortars - for the best part, acrylics that are well apt to handle these new ceramic materials. In fact, these new acrylic latex portland cement mortars have been compared to the non-modified ANSI 118.1 dry-set mortars, to the one-component ANSI A118.4 dry-polymer-modified mortars, and to the traditional ANSI A118.4 normal latex-added two-component latex portland cement mortars for their capacity to stretch and retract to accommodate substrate and tile movements. This is referred to as the mortar's differential movement capability.

• **Differential movement.** The differential movement of the mortar (see fig. 2) represents the distance traveled at break by one of a two-tile assembly under shear load compared to its initial position before this load is applied. Comparing the differential movement of the various portland cement mortars (fig. 3), it becomes immediately evident that the two-component elastic latex added portland cement mortar exhibits, conservatively, seven times more movement capability than the traditional non modified dry-set, and that every polymeric modification increases the differential movement capability of the original non-modified dry-set mortar.

• **Dynamic thermal action on tiles.** Now, if we compare this differential movement data with the linear change in size of an average ceramic tile exhibiting a coefficient of thermal expansion of  $8 \times 10^{-6}/^{\circ}\text{C}$  in response to a temperature change of 60°C (fig. 4), it becomes readily apparent from the computed data on the respective tile sizes that the use of an elastic latex-added mortar becomes almost mandatory for tiles 16" x 16" (40 x 40 cm) or larger, and highly recommended for tiles measuring 8" x 8" (20 x 20 cm) and 12" x 12" (30 x 30 cm). To better understand the dynamics of the potential thermal movement of the ceramic tile in relation to the differential movement





Valprato building - Prato - Italy



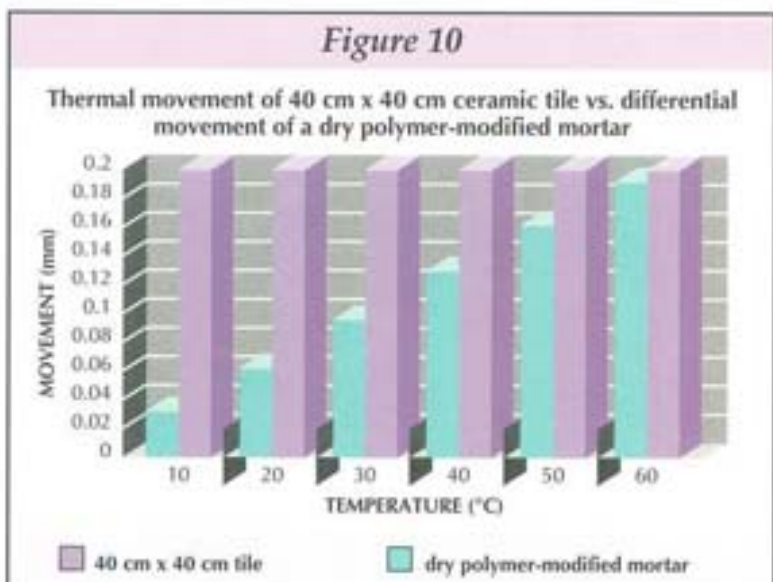
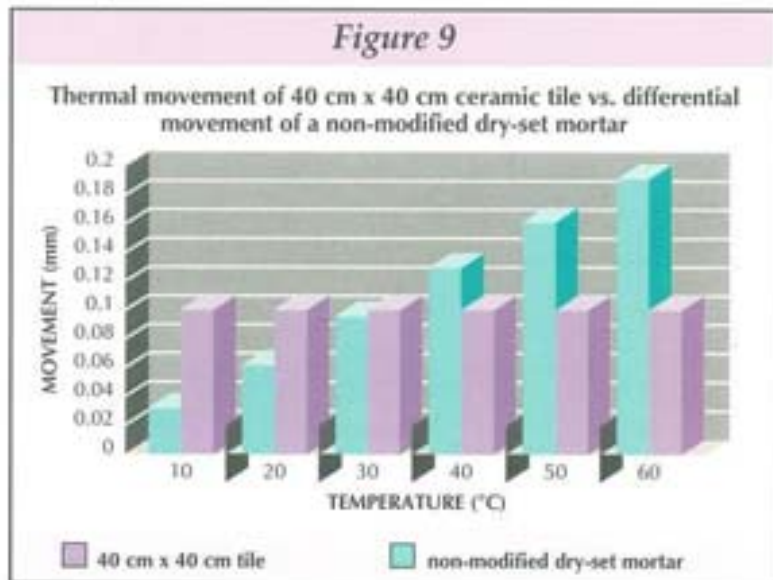
Residential building - Milan - Italy



Flaminio Hotel - Pesaro - Italy

capability of the assorted mortar systems under discussion, let's examine a series of graphs which illustrate precisely this relationship at various temperature variation ranges, from 10°C to 0°C. Such temperature variations are certainly not uncommon in much of North America for an exterior dark-colored tile cladding with a southern exposure to direct sunlight. Any sudden cloud or temperature drop imposes an additional thermal stress on the tile system. It is readily evident from fig. 5 that thermal movement of an 8" x 8" (20 x 20 cm) tile is essentially equal to the differential movement capability of a non-modified dry-set mortar at the higher temperature variation ranges. Therefore, even in the case of an 8" x 8" (20 x 20 cm) tile (Fig. 6), it is preferable to specify at least a two-component liquid added latex portland cement mortar which exhibits a differential movement capability about three times greater than the expected thermal movement of the tile, or a two-component elastic latex portland cement mortar (Fig. 7) whose movement capability is eight times greater at the higher temperature variation ranges. As the unit size of the tiles increases, the need to use a flexible mortar system becomes even more pressing. For instance, in the case of 16" x 16" (40 x 40 cm) tiles (Fig. 8), choosing a non-modified ANSI A118.1 dry-set mortar automatically calls for potential failure, since the expected thermal movement of the tile far exceeds the differential movement capability of the dry-set mortar when temperature variations are greater than 40°C. Using a single-component dry polymer modified mortar is not more reassuring (Fig. 9). In this case, the differential movement capability of the polymer-modified mortar is only, at best, equal to the expected thermal movement of the tile.

•**Material fatigue.** Because of the almost infinite number of thermal cycles that are imposed on an exterior wall cladding during its expected service life, material fatigue becomes another important factor that must not be overlooked (see Fig. 10). With a 16"



x 16" (40 x 40 cm) tile, even a traditional latex portland cement mortar only offers little, if any, long-term security. However, the two-component flexible (elastic) type liquid-added latex portland cement mortar can provide differential movement capabilities that not only exceed the expected thermal movement of 16" x 16" (40 x 40 cm) tiles (Fig. 11), but also offer a built-in "security insurance" takes material fatigue into consideration. In the case of 24" x 24" (60 x 60 cm) tiles (Fig. 12), it becomes obvious that for total security, flexible (elastic) liquid-added latex portland cement mortar becomes a mandatory component of any exterior cladding system, regardless of whether the tiles are installed individually on-site part of a pre-





Aydin Insaat A.S. - Istanbul - Turkey



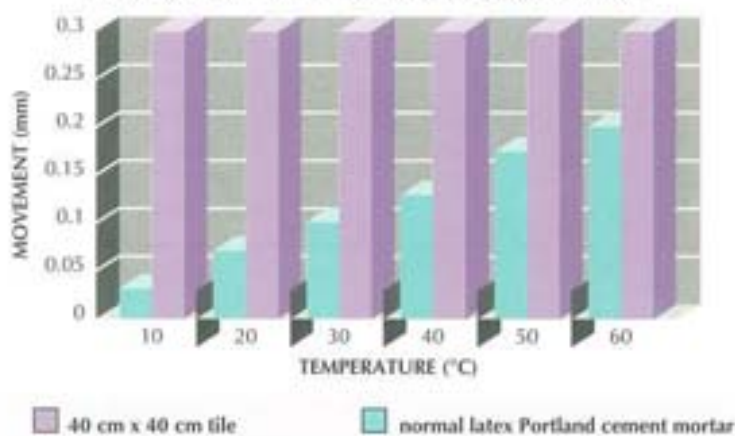
Shopping center - Tel Aviv - Israel



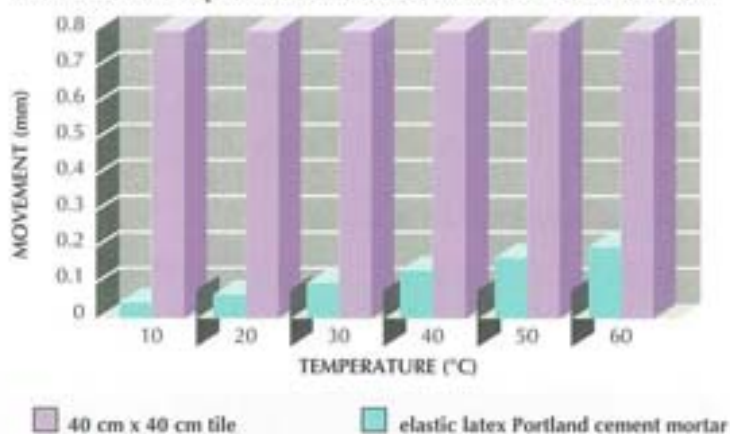
Exhibition center - S. Petersburg - Russia

Figure 11

Thermal movement of 40 cm x 40 cm ceramic tile vs. differential movement of a normal latex Portland cement mortar



Thermal movement of 40 cm x 40 cm ceramic tile vs. differential movement of a liquid-added elastic latex Portland cement mortar



manufactured panel system. Liquid-added elastic latex portland cement mortars, however, are not intended as a replacement, but rather as a complement to good engineering, proper design, quality workmanship at time of execution, and strategically located, well-constructed movement joints.

#### Close Supervision, Conscientious Execution by Experienced Installers

- Tiles must be laid on a fresh mortar bed while the mortar is wet to promote a good mortar contact with the tile.

- All tiles must be installed with ANSI A108 standard recommended techniques for exterior installation in order to obtain not only a proper mortar contact with the tile, but also a continuous setting bed with a minimum of voids throughout its entire depth.

- All joints between tiles must be grouted. In most cases, this is done with a latex-added cementitious grout. Joint widths must be determined according to local climatic condition requirements and tile size. For example, some European standards state that regardless of conditions, joint widths should never be less than 1/16" to 5/16" (2 to 8 mm) for single- or double-fired tiles, or 3/8" (10 mm) for clinker and homogeneous tiles. According to many of the standards recognized worldwide, butt joints and open spaces are never acceptable practices.

- Protect tilework from water penetration and potential freeze/thaw damage with properly installed flashing at the top and bottom of the entire tilework, windows and openings, and provide well-designed, functional, evenly spaced and strategically located weep holes through the lower tile joints.

- Isolate the tilework by peripheral elastomeric movement joints, and by dividing the work with properly engineered movement joints at regular intervals in all directions. As already stated, the general guidelines of the TCA Handbook Detail EJ-171 should be followed.

#### Conclusion

In view of the foregoing, it becomes easily understandable that two-component liquid-added flexible (elastic) latex portland cement mortars, together with well-designed, well-constructed isolation and movement joints, tight supervision and conscientious execution by experienced installers are close-knit, mandatory complements that altogether will contribute to a... HAPPY TILING!

Louis H. Couillard is director of technical services at Mapei Inc., Laval, Canada.



# A SEALANT FOR THE HIGHEST HYGIENE

by Francesco Stronati

KERAPOXY, WITH ITS PARTICULAR FORMULATION GUARANTEES THE REALISATION OF A FINAL GROUTING CHARACTERISED BY A HIGH CHEMICAL RESISTANCE AND BY A REMARKABLE DEGREE OF HYGIENE.

The technical necessity of carrying out the installation of ceramic floor and wall tiles with joints of variable dimensions, depending on the format of the tile, is by now accepted, at a normative level, by more advanced countries. The sealing of these joints is normally carried out with cement based grouts. Nevertheless, there is often the need to carry out grouting that is impermeable and resistant to acids, is easily cleaned and is capable of creating a flooring that is totally aseptic. This requirement becomes imperative in the cases in which the USSL, following prescribed EEC directives, prescribe, for obvious motives of hygiene, this type of grout in all environments designated for the processing of foodstuffs, such as creameries, dairies, abattoirs, wine producers, etc.

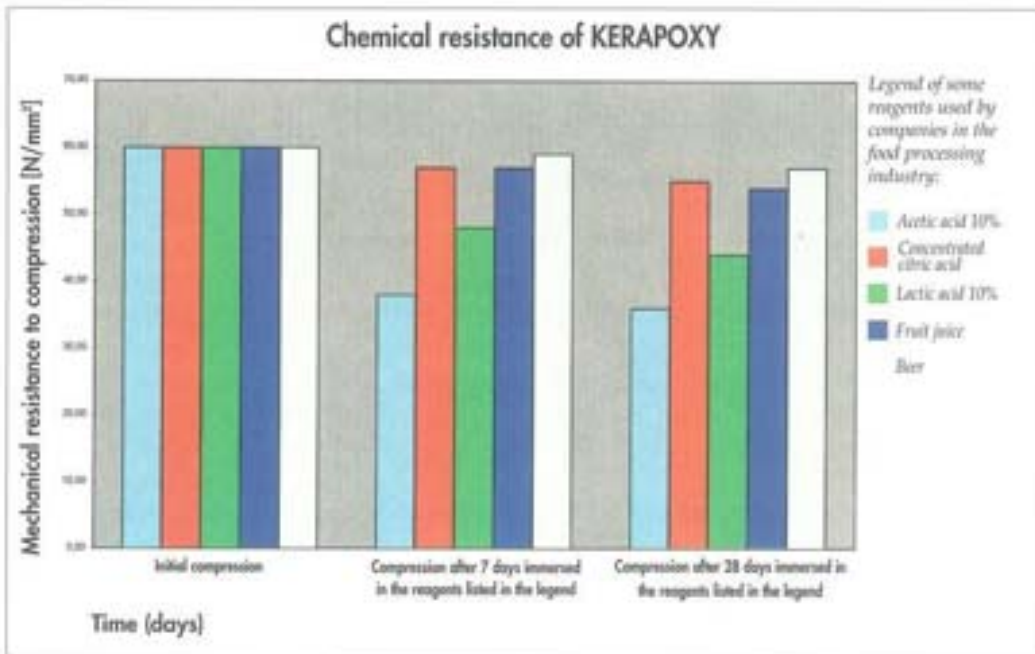
In fact, in these environments the grout must prove to be chemically impregnable and therefore durable in time, even if under the aggressive actions of washing substances, such as organic and inorganic acids or products used to carry out intensive cleaning. These requirements certainly can not be satisfied by the usual cement based grouts because of their absorbency,



and chemical resistance, by excellent colour stability and by total impermeability. The fields of application of KERAPOXY are truly vast. It is suitable for the grouting of swimming pools of thermal waters; in this case the absence of porosity in the joints of KERAPOXY impedes the growth and accumulation of mold and other micro-organisms and contributes to the impermeability of the pool. It is effective for the grouting of tanks containing chemically aggressive water, for example in the case of purification plants. Moreover it can be used to seal the joints of ceramic tiles on work tops, kitchen and bathroom surfaces and for the bonding of anti-acid tiles. Severe laboratory and building site tests have demonstrated that KERAPOXY has high chemical resistance regarding the aggressions of most organic and inorganic acids, and

even if limited, and their tendency to degrade under the action of these agents. These problems can be easily overcome thanks to the utilisation of KERAPOXY, anti-acid epoxy sealant for the grouting of ceramic tiles. Its particular formulation, developed closely by Mapei's research laboratories, in fact guarantees the realisation of a final grouting characterised by high mechanical

FIGURE A



Source: Mapei's Research Laboratories



of other basic substances. There are exceptions such as the solvents trichlorethylene and acetone, and some organic acids such as oleic acid. This last one, in particular, is present in large quantities in animal fat that, when coming into contact with the grout, creates bulging. This aggression becomes more severe for example in the cooking rooms of meat factories when the hot animal fat comes into contact with the grouting. The degradation, in this case, is much faster and more violent. To resolve this specific problem there is KERAPOXY SP, a three component epoxy sealant with high chemical resistance. KERAPOXY is prepared by homogeneously mixing the resin (component A) and the hardener (component B), supplied in packaging with the correct mix ratio, in a way as to comply with their correct mixing ratio. In this way a mortar is obtained that can easily be applied with a rubber trowel within 45 minutes of its preparation at a temperature of +23°C. Cleaning of fresh product from the flooring is carried out manually, using a hard sponge or Scotch-Brite, otherwise mechanically with a single brush machine. To facilitate the cleaning of tiles grouted with KERAPOXY it is necessary to pour clean water onto the surface

*KERAPOXY is suitable for carrying out grouting in all environments, also those designed for the processing of foodstuffs.*

so as to improve its emulsion. It is necessary to ensure that the ambient temperature during application does not fall below +12°C. In fact, above this temperature, KERAPOXY presents itself as an easily applied soft paste. If the temperature falls below +10°C it becomes hard and difficult to work. In large installation areas it is recommended to work in pairs: one worker to carry out the grouting and the other to follow up immediately behind, cleaning the flooring. KERAPOXY is available in a range of 24 colours allowing the perfect aesthetic matching with the complete range of coloured ceramics available on the market. Flooring carried out with KERAPOXY, at a temperature of +20°C, is ready for traffic after 24 hours, and it is possible to subject it to acid attack after 4 days.



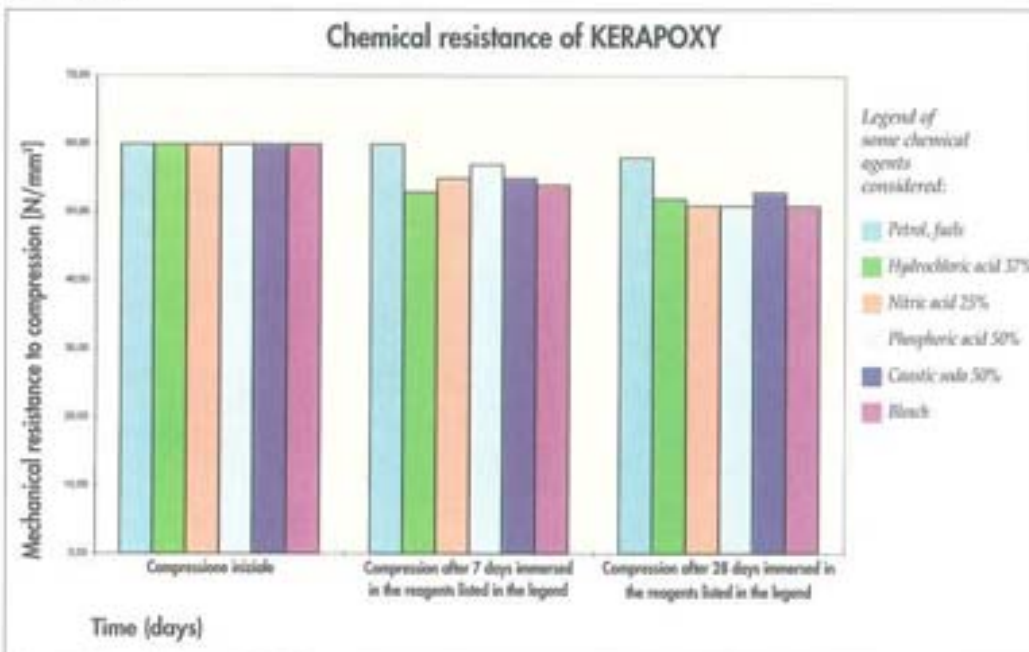
The technical data sheet for KERAPOXY is contained in Mapei binder No. 1 "Ceramic Tiles Adhesives"



Figures A and B  
The chemical resistance tests of KERAPOXY are carried out on samples of materials that, after 7 days of reticulation, are completely immersed in the diverse chemical reagents at an ambient temperature of +23°C. Subsequently, after a predetermined

period, the mechanical resistance of the samples is measured and compared with the measurements taken before the immersion. Figure A shows the chemical resistance of KERAPOXY with regard to chemical attack from the most common agents used in the food industry, both in the commercial and domestic environments. Figure B shows the same data with reference to the most common chemical agents that may be found in the chemical industry.

FIGURE B



Source: Mapei's Research Laboratories



# A Royal presence

ULTRACOLOR FORMS PART OF THE MONUMENT DEDICATED TO DON JUAN OF BOURBON.

The sculptor Victor Ochoa considers it "the most important work of his career". The 16 meter high monument with a weight of ten tons, represents a tribute to the memory of a very beloved man in Spain: Don Juan of Bourbon. The memorial is located at the center of the Campo de las Naciones nearby the Palacio de Congresos. The monument was unveiled last summer in front of a crowd which included His Majesty the King of Spain, Don Juan Carlos, and several other influential people, such as Doña Maria de las Mercedes.

The bronze and steel head, which represents Don Juan of Bourbon, sits on top of a large stone solid. This stone rests on a large granite surface separated into wide geometric shapes by anthracite colored grouts. The granite slabs were installed in a traditional way, with large joints filled with the final grout. The width of the joints (3.5 cm) and the heavy traffic crossing the floor made it necessary to chose a special grout, ULTRACOLOR. ULTRACOLOR is a rapid-setting and hardening cement



*The monument rises on a base supported by the scenographic flooring made of large granite slabs. The joints were filled with ULTRACOLOR, a special rapid-setting and hardening cement mortar*

*To the left a snap shot: the Royal Family of Spain is present at the celebration*





*The technical data sheet for the products mentioned in this article is contained in Mapei binder No. 1 "Ceramic Tiles Adhesives"*



mortar for grouting ceramic tile and natural stone. ULTRACOLOR does not craze even when applied in great thickness and is highly resistant to mechanical stresses and to wear over time. The choice of ULTRACOLOR was particularly effective from an aesthetic standpoint since it enhanced the triangular shapes of the slabs. The monument is an important contribution to a larger embellishment program comprising the entire city of Madrid. It has also become an important tourist attraction visited by at least 15 million people a year.






 MAPEI  
SPORT

# A research centre for all cyclists



**M**apei Gb is a team cut out for records. There have been 221 victories for the "cubed shorts" team in the last three seasons. It is also the first cycling club that has created a structure for the programming of training and scientific medical assistance for athletes. Mapei's Sports Division Research Centre is at Castellanza, between Milan and Varese: one thousand square metres, on three floors, in an elegant building. The presentation of the Centre, coordinated by the management of the Mapei Group and of the Mapei Gb team, has been honoured by eminent authorities, amongst which Agostino Omini, vice president of the International Cycling Union. The team of "cubed shorts" was represented by the world champion Museeuw, by the gladiator Tafi and by the "joker" Nardello. Also present were Cioni and Induni, members of Mapei Kona, a company that closely looks after the cross-country cycling activity.

Says Giorgio Squinzi, Managing Director of the Group, "There are 25 racers in the Mapei Gb team. They must be uniquely assisted by our Centre. We do not want

collaboration from external doctors or trainers. We strive to win in a clean way. Better a little less success, but with the knowledge of having done it correctly. Clearly we have not only created the Centre to fight against doping; investment in research is part of the philosophy of our Group, both for flooring adhesives and chemical building products and for cycling. I have been dreaming of

The activity of Mapei's Sports Division Research Centre is carried out in three diverse areas:

#### RESEARCH CENTRE

Area of interest: training, biomechanics, functional evaluation, psychology and nutrition.

#### BIOMEDICAL CENTRE

Determination of body fat  
Biomechanical evaluation  
Anaerobic threshold evaluation  
VO2 max evaluation  
Programming of training  
Formulation of correct nutrition  
Psychology of sport

#### ENGINEERING

Utilisation and exploitation of the know how of the Research Centre  
Execution of specific tests or experiments on behalf of industries that operate in the sporting sector.

Consultancy for the development of new products.





At the presentation of the Centre were present, besides management staff, also dignitaries and athletes.

In the photo from left to right: Daniele Nardello, Aldo Sassi, Giorgio Squinzi, Andrea Taft, Ernesto Colnago and Johan Museeuw

realizing a centre like this since I was pedalling as an amateur. It will help the athletes of Mapei Gb, and those of the satellite companies that look after youth activities or cross-country, and all those that would like to frequent it, both professionals from other teams and amateurs.

Even racers, that during the race are our arch rivals, can come here without problem. They will be welcome." Mapei's Sports Division Research Centre is managed by professor Aldo Sassi. "We

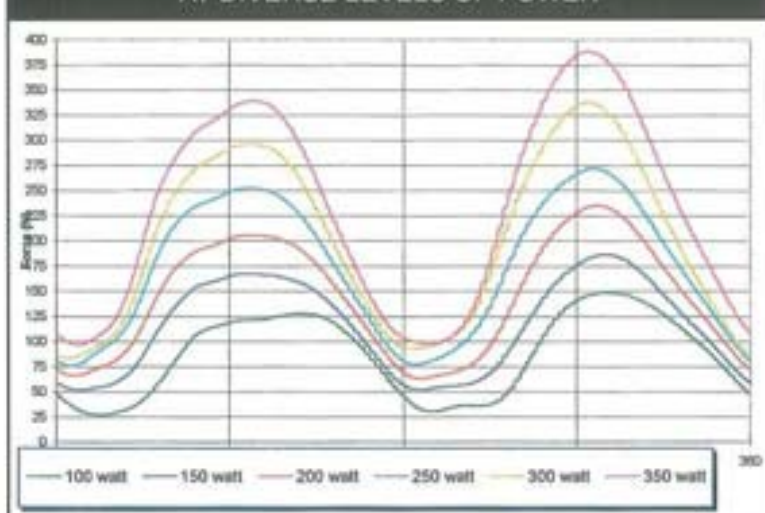
have not created a structure directed only at athletes of a high standard" - says Sassi - "even amateurs or sportsmen that do not carry out sporting activity at such a high level can frequent it. They will be assisted with the same equipment and care used for the champions. At the Centre specific tests or experiments will be carried out on behalf of industries that operate in the sporting sector, also providing advice for the development of new products." With Sassi works Doctor Giovanni Ruffini, the laboratory technician Andrea Morelli and the masseur Massimiliano Coppini. There is also consultancy from psychologist, Doctor Sergio Rota, and from other specialised doctors. The Centre comprises two surgeries, a room equipped for physiotherapy, and a room for the programming of training.

The biomechanic laboratory, with the Elite system for kinematic analysis, is a jewel. "In collaboration with Cicli Colnago" - underlines Sassi - "we are taking forward a project for further improvement." Using an infrared camera and a computer it is possible to reconstruct the action of the feet, verifying if the way of pedalling is round or whether it is necessary to correct of the sitting position or the size of the bicycle. The successive application is the evaluation of the power exerted in every phase of the pedalling action. At the Centre it is also possible to undergo plicometria, that is the evaluation of the percentage of body fat. There is equipment to establish the maximum consumption of oxygen and to support the testing of anaerobic threshold. It allows to establish at which constant speed the athlete commences to perceive symptoms of fatigue. The building is equipped with facilities for the post traumatic recovery of the athlete. Moreover there are ergometers in the physiology laboratory, realized through the valuable partnership with Technogym.

"The ergometers" - continues Sassi - are very useful for training: they are able to reproduce the situation of open air pedalling." Also in the gymnasium there is Technogym equipment.

From every part of the world it is possible to converse with the Centre. It is present on the Internet and a post box is reserved for athletes who can transfer to the Centre the cardiac rate data of training and racing. For every frequenter of Mapei's Sports Division Research Centre a computerized report with all the verified values of their training tests and schedules is prepared.

#### APPLICATION OF FORCE PATTERN ON PEDALS AT DIVERSE LEVELS OF POWER



One of the tests carried out at Mapei's Sports Division Research Centre shows the trend of the effective component (that is that which effectively contributes to propulsion) of force applied to the pedals, in function to the angle of the pedal crank (in abscissa). The different coloured curves distinguish the levels of power at which the survey has been carried out. At an angle of 0° the left pedal is found at the highest point of its rotation and the right pedal at its lowest; vice versa at 180°. On the left pedal peak force is applied to about 100° (that is a little after the passage of the left pedal crank through the horizontal line), while on the right pedal peak force is reached at about 280°. Therefore in the first 180° is represented the thrust applied with the left leg and from 180° to 360° that applied with the right leg.

Elaboration software of Mapei's Sports Division Research Centre

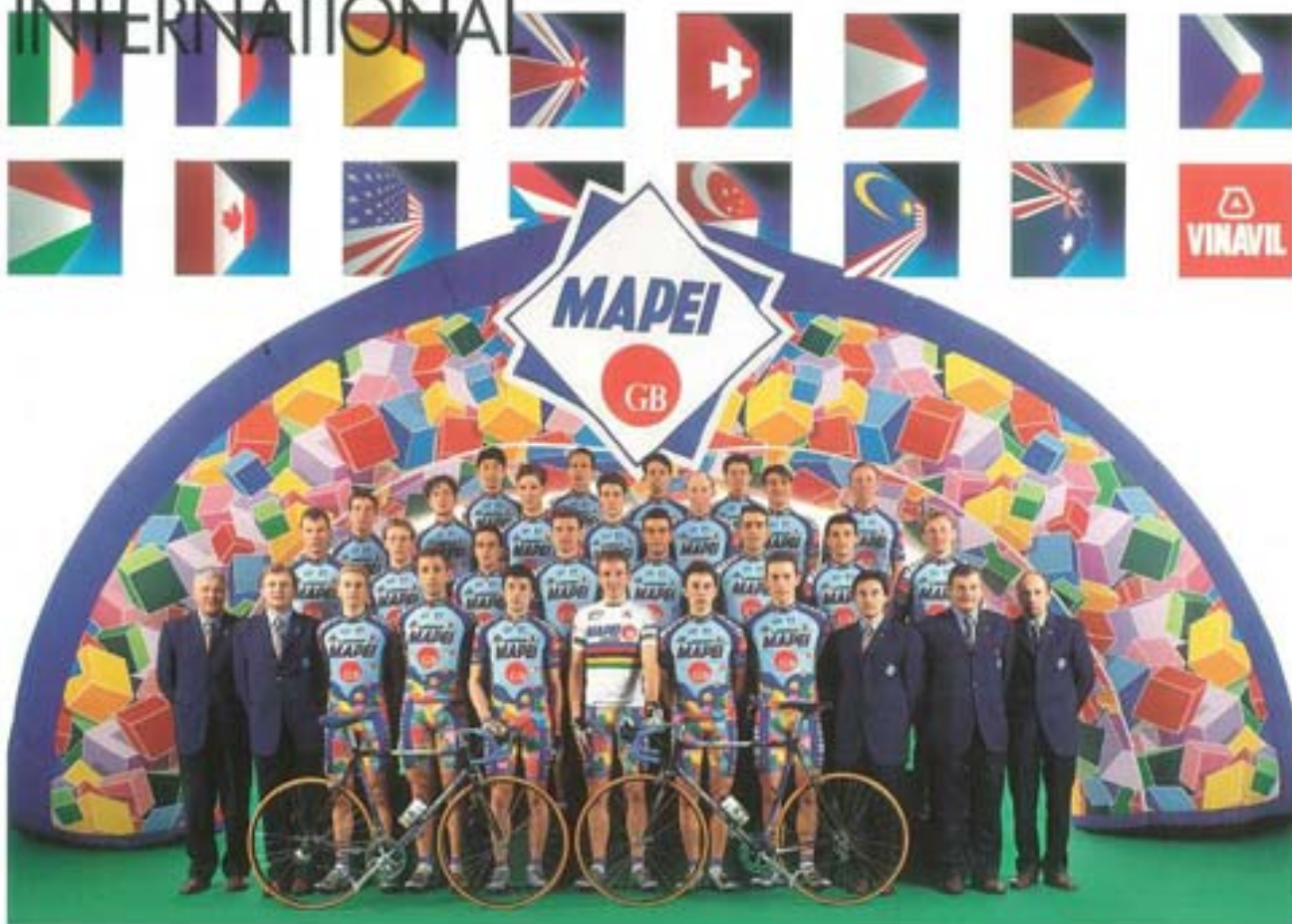
Aldo Sassi, director of Mapei's Sports Division Research Centre, was born in Valmorea (Como) on the 28th April 1959. He has a diploma in industrial engineering. In 1983 he obtained a diploma in physical education. In 1995, in France, he obtained a degree in the technical science of physical and sporting activities. As an athletic trainer he started with Seregno football club. In '82 he worked with the professional racers of Hoonved. At the end of 1983 the Enervit Team made him responsible for the training of Moser in his attempts on the hour distance record of Mexico City. Trained by Sassi, Moser twice established the hour distance record in January 1984. He was amongst the first to believe in the mountain bike phenomenon. All the best mountain bike athletes have undergone tests in his laboratories. In '94 he prepared Indurain, who for some months was the hour record holder. At present Professor Sassi is the athletic trainer for Mapei Gb and Mapei Kona. He has also written books on training for important publishing houses.





# MAPEI GB ALWAYS MORE

## INTERNATIONAL



“In the sporting and industrial field - say the experts - you are not a specialist if you are not international.”

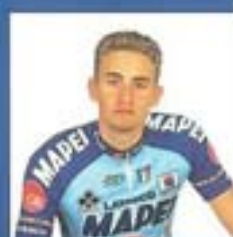
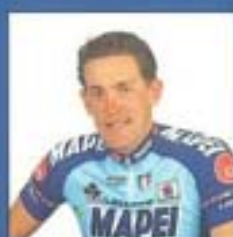
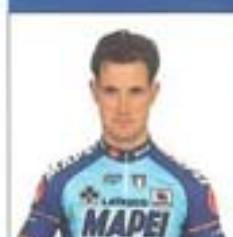
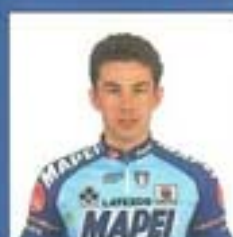
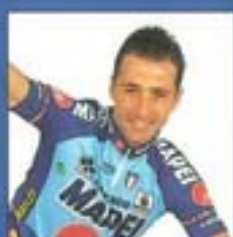
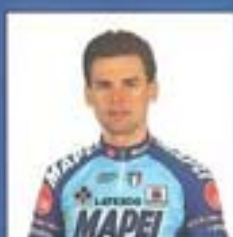
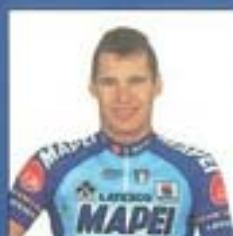
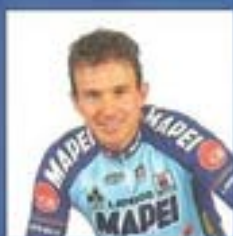
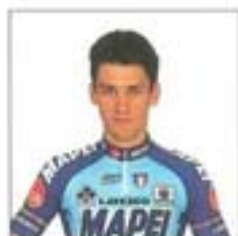
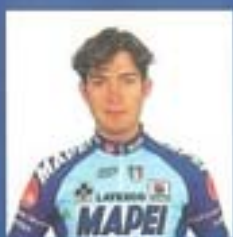
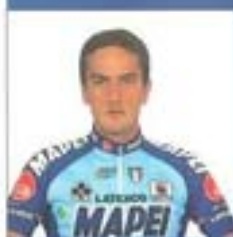
Faithful to this principle, the new Mapei Gb has become more international. In '96 the cubed shorts team has obtained 82 successes lining up 31 athletes, representing 4 countries. This year, respecting the international disposition, Mapei Gb has limited team membership to 25 racers, but the number of countries represented has become 7. To coordinate this confusion of languages Giuseppe Saronni has arrived. The new manager boasts a glorious past, with 200 victories amongst the professionals. Those in the know attending the press conference paid tribute to Saronni and to the sports directors Pietro Algeri, Patrick Lefevere, Maurizio Piovani and Fabrizio Fabbri with enthusiastic ovations. The potential

### A POLE POSITION SUPER WINNING TEAM

According to the new measures of the International Cycling Union every Sporting Group in 1997 can not give a membership card to more than 25 racers. The limitation has imposed a radical change of team structure. In spite of this Mapei Gb is still at the peak of the world classification, Mapei Gb has 9076 points, ahead of Once (7033), MG (6045), Telekom (5968) and all the others.

Mapei Gb merits the definition of "super-winner". In all the principle world events of the winter '96-'97 the athletes or management of the team have been prizewinners. Johan Museeuw opened the series by being awarded the "Velo d'Or 1997" by an international jury. The gladiator Andrea Tafi has been awarded the prize "Amici del ciclismo" of Cremona. Mapei Gb's Tuscan racer has been acclaimed together with other great champions from other disciplines on the stage of the Torretta Prize in Sesto San Giovanni. Andrea then went to the lavish Bergamo Congress Centre, collecting the Sportnove prize and the "Raggio d'Oro". Mapei Gb has dominated the classification of teams of Sportnove. Moreover the team has been given a prize at the evening of the Association of Professional Racers at the Forte Crest Hotel in Assago. Daniele Nardello has received, in Carate Brianza, the Memorial Fabio Casartelli. Some team members of Mapei Gb have honoured the party for the 50 years of Sportful in Pedavena, amongst the mountains of Belluno. Moreover Mapei Gb, for the second consecutive year, has received the "Ammiraglia d'Oro" from Mobili Lissone.





Here are the 1997 Mapei Gb representatives. From the left, on top: Abe, Ballerini, Bomans, Bramati, Bugno, Di Grande, Faresin, Fois, Jaskula, Lanfranchi, Mattan, Missaglia, Museeuw, Nardello, Peeters, Spruch, Steels, Svorada, Tafi, Tonkov, Camenzind, Leysen, Pianegonda, Zanini, Vandenbroucke. The technical staff is represented by: Saronni (manager), Sola and Criquelion (press liasons), Lefevre, Algeri, Fabbri and Piovani (directeurs sportifs).







Andrea Tafi (5), the cobbles locomotive Franco Ballerini (3), the joker Daniele Nardello (4), Paolo Lanfranchi and Giuseppe Di Grande.



The team, that will continue to use Colnago cycles, presents interesting new faces starting with Gianni Bugno, the monzese of formula one. Gianni, winner of 4 races last year, will try to repeat his former great laurels. Pavel Tonkov, a Russian from Samara, will try to explode in the great stage races. Last year he won the "Giro d'Italia" and a further 7 races. Jan Svorada (Czech Republic), 9 victories in '96, is an excellent sprinter. Then there are the Swiss Oscar Camenzind (4), Stefano Zanini (3), the first Italian to win the Amstel Gold Race, the Poles Zenon Jaskula and Zbigniew Spruch, Davide Bramati and Gabriele Missaglia from Milan, Gianni Faresin (1) and Gianluca Pianegonda from Vicenza, Valentino Fois (1) from Bergamo, the Belgian Nico Mattan (1), and the Japanese Yoshiyuki Abe (1).

at the disposition of the sports directors is enormous. Johan Museeuw has been reconfirmed as the only athlete in history as having won, in the same year, both the world championship and the World Cup. Last year Johan managed to triumph in another 5 races. Also remaining in the Mapei Gb jersey are his fellow countrymen Frank Vandembroucke (15 successes), Tom Steels (8), Wilfred Peeters (2), Bart Leysen (2), Carlo Bomans (2). In the great classics again we will see in the attack



1997 Mapei Gb multinational team has been presented first in Milan last January 31st and then in Bologna, at the Saiedue tradeshow, last March 19th, where in a Hollywood scenario, the Spanish showgirl Natalia Estrada has played the team's godmother.



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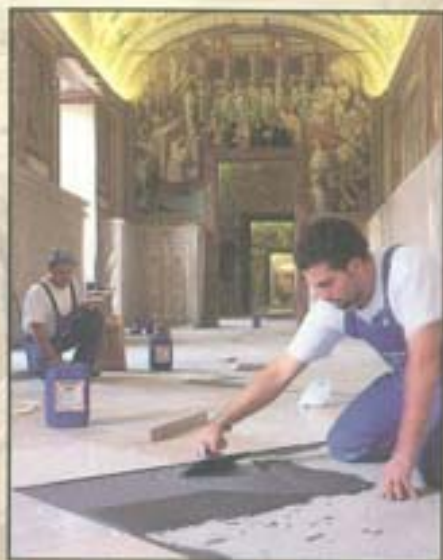
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