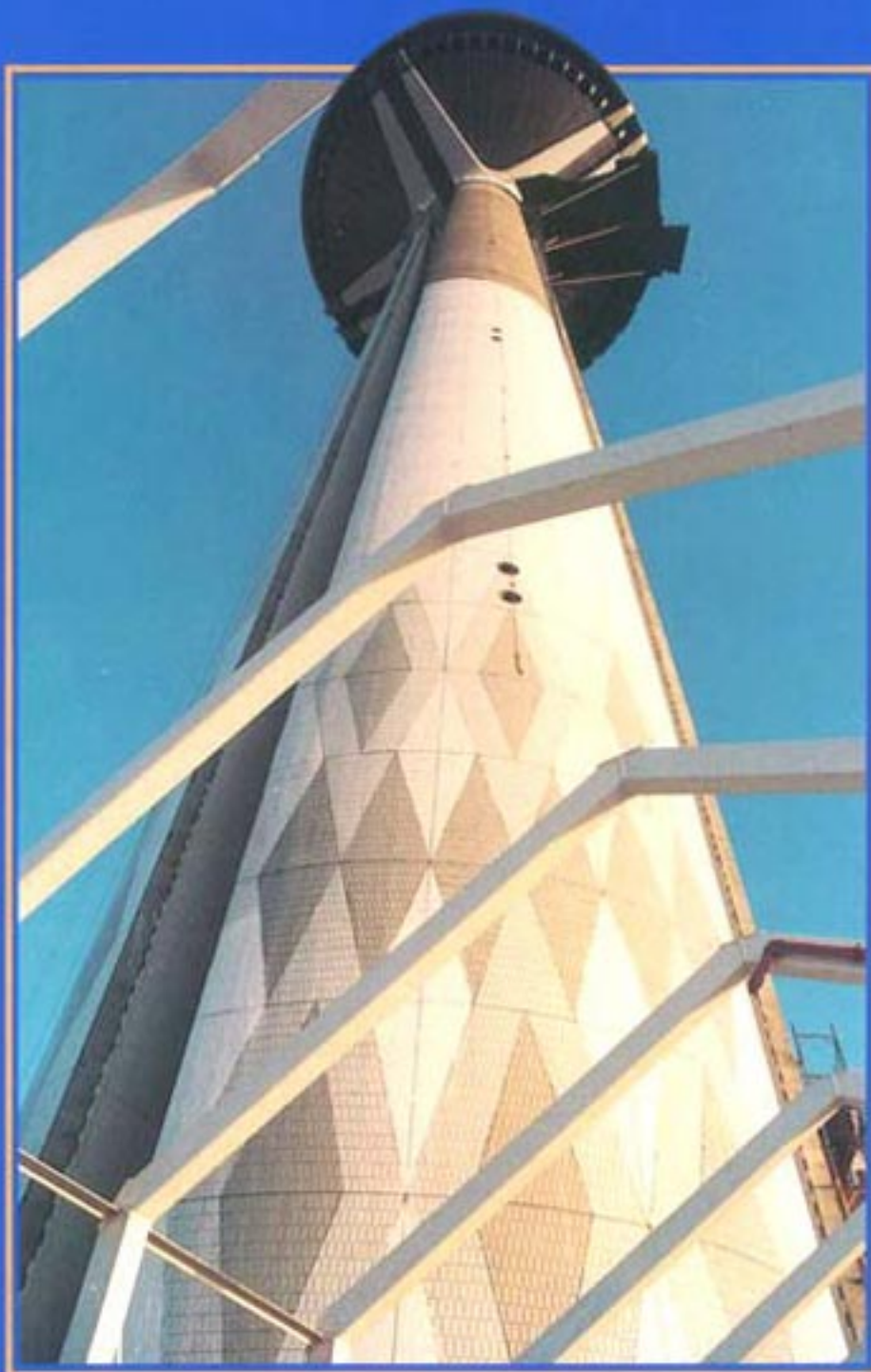


INTERNATIONAL
REALTÀ MADEI



The tower of freedom

Giorgio Squinzi is
Federchimica's
new President

The Habsburg Empire

Floor joints



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with Mapei products"
and "Screeds and
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Cover main photo: An image of the Telecommunications Tower of Kuwait



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THE TOWER OF FREEDOM

THE WORK OF COVERING THE TELECOMMUNICATIONS TOWER OF KUWAIT CITY, CARRIED OUT IN DIFFICULT CLIMATIC AND SITE CONDITIONS, WAS COMPLETED ON TIME THANKS TO THE SKILL OF THE WORKFORCE AND TO THE VALIDITY OF THE PRODUCTS USED.

by Giorgio Roncan - Photo by Luca Aliprandi

In 1988 the Ministry of Public Works of Kuwait has given the go ahead for the construction, in Kuwait City, of a new telecommunications tower under the direction of the Swiss design company EWI, Elettrowatt Engineering Service Consultant (manager Dott. Eng. Martin Buxtorf).

The construction, in conical reinforced concrete, with a maximum height of 372 metres, is one of the highest in the world. As can be seen in Figure 1, the tower has, at the height of 150 metres, the first zone used for services, amongst which is a restaurant, while, at the height of 184 metres, one finds the telecommunications station; from 221 to 372 metres rises the extremely high antenna. The two platforms are supported by two "hands" of concrete, respectively of 8 and 12 fingers.

In section the tower is formed by 4 quadrants (Fig. 2),

PHOTO 1

equally spaced by recesses, where the external lifts are inserted that rise spectacularly to the first platform positioned at 150 metres.

In August 1990 the tower had already reached a height of 220 metres, when, because of the Iraqi

invasion, the works had to be suspended. The construction, as the rest of the country, was enveloped in a dense black cloud created by the oil well fires; at that time the greasy soot was so thick that cars were obliged to travel by day with their lights on.

The conflict over, the works were able to be restarted only in 1993; rapidly the tower reached its maximum height and in 1994 the construction in concrete was finished.

A lifting for the tower

The government, having decided that the tower must become the symbol of the re-found freedom of the nation, after the events of war, proposed to change the towers



PHOTO 2

Graph 1
Temperature recorded
in Kuwait during the
course of a year.

Fig. 1
Elevation of the tower

Fig. 2
Section of the tower

Photo 1

The covering of the
tower was carried out
by Italian and local
installers

Photo 2

View of the tower
before the installation
of the tiles

Photos 3-4

To avoid the high
daytime temperatures,
the work was carried
out at night

Photo 5

A phase in the
installation of the
clinker tiles on the
upper platform of the
restaurant at a height
of 150 metres

GRAPH 1

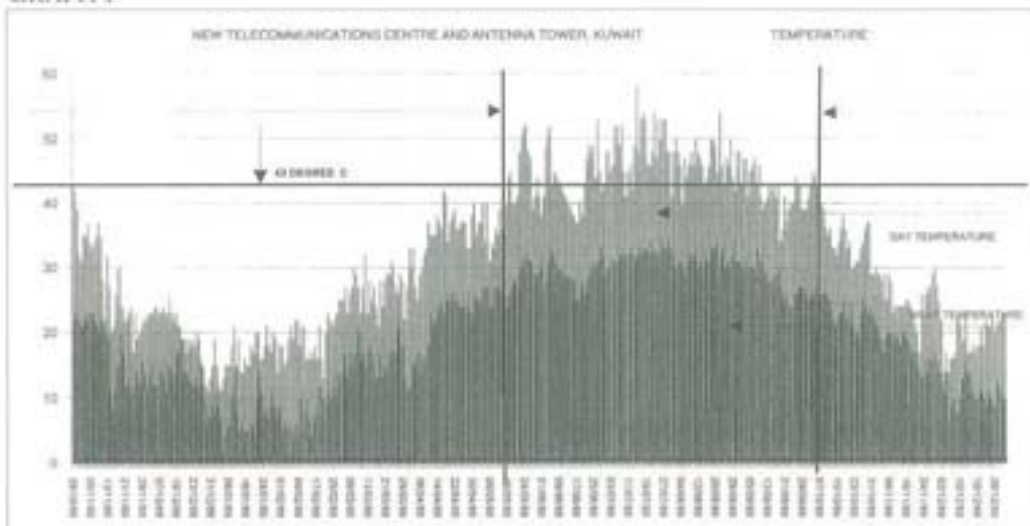


PHOTO 3



PHOTO 4

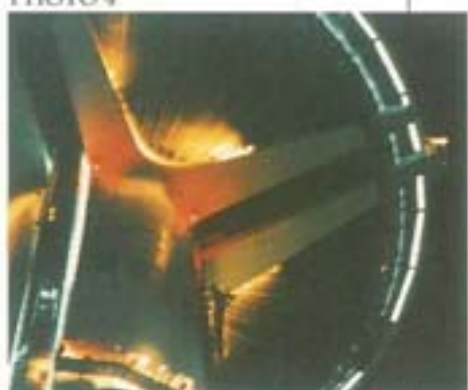


PHOTO 5



"cladding", intervening with an operation of lifting. What was wanted was a stylish covering, either esthetically pleasing and original or capable of resolving some technical problems: to be durable, maintenance free and able to protect the concrete surface from the abrasive action of the desert winds loaded with sand. Diverse solutions

were taken into consideration and in the end the decision was arrived at was to cover the concrete surface with ceramic tiles up to 184 metres and to paint the surface with epoxy paints from 221 to 308 m (the other parts consisted of glass and metal structures). 12x24 cm clinker tiles were chosen from Gail, supplied by the Kuwaiti company Hassan Abul.

Work in the desert

Around 14,000 square metres of tiles had to be installed, respecting very tight completion times: the start of the work in fact was fixed for the 1st of April '95 while completion was programmed by the end of the year in order to allow for the inauguration in February 1996. A difficult situation in normal conditions, made more problematic in view of the particular climatic conditions of the country. In graph 1 we show the temperature in the various months of the year,

both during the day and during the night. As can be seen, already in April, the daytime temperature never falls below +30°C, while from May to October it is nearly always above +40°C, falling at night by about +10°C. Humidity is obviously extremely low, being a desert zone: it varies in fact from 50% to 7-8% during the whole of spring, summer and autumn.

Products and men for a quick and perfect installation

The management for the installation of the tile covering was entrusted to the Kuwaiti company GSTC-PSC Group that, after careful consideration, decided to

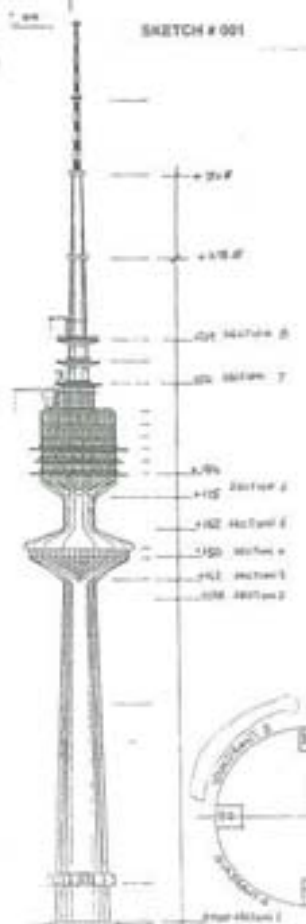


FIG. 1

FIG. 2

PHOTO 6



PHOTO 7



Photo 6
The upper part of the tower consists of platforms supported by "hands" covered with ceramic tiles
Photo 7
Detail of the installation on the upper "hands"

Why KERABOND + ISOLASTIC

KERABOND has been chosen because the adhesive, being made of a cement powder and a synthetic acrylic based latex, combines all the indispensable requirements for an installation as that described.

It is easily prepared and the mix has excellent workability: the paste is creamy, easy to spread and adheres to the support perfectly.

Moreover it guarantees a very long open time; specifically for this project, a special formulation has been designed by our laboratories, with a prolonged open time that has allowed the excellent Latina installers also to work in prohibitive conditions (up to +34/36°C).

The high thixotropy of the adhesive has allowed the installation of the tiles, as well as vertically on the very long conical trunk wall, also overhead on the reinforced concrete hands that support the platforms. The adhesion with

values above 10 kg/cm² has assured, together with the elasticity which is the highest that can be found for a cement based product on the world market, a perfect technical blend able to overcome the stresses from the continuous thermal dilation to which the tiles are subjected to (the temperature in fact can go far above +50°C) and from the action of the hot winds that is often very strong. In the end KERABOND with ISOLASTIC has been chosen also because it is the most widely used adhesive in the world for the external laying, with millions of square metres of tiles laid in over twenty years of always successful experiences.



Mixing Kerabond and Isolastic

PHOTO 9



PHOTO 8



give responsibility for the tile installation to the company Pafint srl of Latina (Italy), under the management of surveyor Gianfranco Moretto. The team of 20 Italian installers, accompanied by about 40 assistants, for the main part Indian and Pakistani, started the works on the 1st of April 1995. In the meantime Mapei having beaten the competition by offering a system of installation that, with careful examination by the commission consisting of all the components of the technical staff (ministry, consultants, construction companies, installation companies), supplied the greater guarantee of success.

The technical specifications, prepared by Mapei technicians, after numerous visits to the project site, practical tests and evaluations of the particular conditions of the work, covered these fundamental points.

• Cleaning

First of all the cleaning of the concrete surface with water at a pressure of 2,000 atmospheres, in order to remove 1-2 mm of concrete impregnated with soot, formed because of the greasy cloud provoked by the fires during the Gulf war.

• Repairs to the concrete

Where necessary, work proceeded with repairs to the concrete using NIVOPLAN,

Photo 8
Detail of the ceramic covering of the "hands" of the tower during stuccoing
Photo 9

Detail of the structure of the upper beams during the stuccoing phase

Photo 10

An interesting view of the body of the tower after the application of the ceramic covering



Photos 11-12-13
Some images of the
phases of installation
on the upper and
lower parts of the
platform



PHOTO 11



PHOTO 13



Manhattan grey n. 23;
while the expansion
joints, installed every
4x4 m, were sealed
with MAPESIL LM,
colour Manhattan grey
n. 23.

• **Cleaning**

The cleaning of the residual
KERACOLOR was carried out with
KERANET.



levelling mortar for walls, with the
addition of PLANICRETE, synthetic
rubber latex for cement mixes. In some
zones small and quick repairs were
carried out (only in periods that were not
too hot) with NIVORAPID, thixotropic
levelling mortar for ultra-rapid drying
applications.

• **Bonding of the tiles**

To deal with the fluctuations between
day and night time temperatures and to
ensure the perfect bonding of the tiles
over the total height, the adhesive
KERABOND was used, mixed with
ISOLASTIC, flexible latex for cement
based adhesives, without dilution, and
applied with a N. 6 notched trowel, both
onto the surface of the concrete and onto
the back of the clinker tile.

• **Grouting and expansion joints
of the tiles**

The 8 mm grouting joints were filled
using KERACOLOR large grain, colour



PHOTO 12



A strengthening layer

With consideration that the "hands" that
supported the platforms could be
subjected to small deformations due to
the weight of the restaurant and of the
area occupied by telecommunications, it
has been planned to cover the concrete
of these two areas, before the laying of
the tiles, with a further 2-3 mm layer of
KERABOND and ISOLASTIC as an anti-
cracking precaution.

Work in a record time

The installation of the 14,000 square
metres of clinker tiles was carried on
until the 10th of July, working in the last
few weeks only at night, from 24 to 7 in
the morning, when the temperature was
lower at +34-36°C.

PHOTO 14



PHOTO 15



Photos 14-15
Details of the covering; mobile platforms were used to carry out the installation
Photo 16
Some members of the installation team at the completion of the works

PHOTO 16



The works, suspended for two months, started again on the 26th of August and finished, ahead of schedule, at the beginning of November.

Italians, professionals of the desert

Particular mention is merited of the extraordinary professionalism demonstrated by the Italian workforce that carried out the work in extremely difficult, and often very dangerous, conditions.

In fact they have been obliged to work day and night at temperatures reaching +36°C, living during the day in the hotel, where the air conditioning allowed them to forget that the outside the temperature was +48-50°C, drinking only orange juice and Coca-Cola because wine and alcohol is strictly forbidden. □

The technical information sheets for the products mentioned in this article are contained in Mapei binders number 1 "Ceramic line" and number 3 "Building line".



TECHNICAL DATA

Project: Telecommunications tower, Kuwait City

Start of works: 1/4/95

Completion of works: November 1995

Managing contractor: EWL, Elettrowatt Engineering Service Consultant

Project Manager: Dott. Eng. Martin Buxtorf

Contractor for the installation of tiles: Pafint srl, Latina, (Director: Surveyor Gianfranco Moretto)

Coverings: Clinker tiles 12x24 cm from Gail, supplied by the Kuwaiti company Hassan Abul

Products for the levelling of the concrete:
NIVOPLAN
PLANICRETE
NIVORAPID

Products for the installation of the covering:
KERABOND + ISOLASTIC
KERACOLOR LARGE GRAIN Manhattan grey n. 23
MAPESIL LM Manhattan grey n. 23
KERANET

The Mapei products were supplied by the Hassan Abul company.

Back in the Middle Ages

This concerns the restoration of the walls inside an historic building, built in various stages starting from 1100 AD. In addition to the internal frescos, recovered by Mr Sutter Anton from Pietrasanta (LU, Italy), all the internal plasters have been restored using Mapeantique MC and finished with lime putty, both in the entrance Hall, and in the "Council hall" on the first floor. The rooms and the entire building will become a library.

Nicola Sbrana

Péccioli is a small medieval town in the province of Pisa (the Italian town of the leaning tower), that developed around three principle elements: the Church, the main square and the "Palazzo Pretorio". The council administration, with the intention of architecturally restoring and civically recovering the Palazzo Pretorio, the actual town hall, requested the work to

be carried out in single sections at a time, without disrupting the organic aspect of the "palazzo" and its urban structure. In particular the project proposed the functional restoration of the main thoroughfare, the use of the cloister and the recovery of the loggia; considering it, moreover, important to recover, in a short time, the public function of some spaces that up to now

had been used for storage and for private associations. Physically the Palazzo Pretorio of Péccioli is inserted together with other buildings that, being part of the original construction, distinguish themselves appreciably from those added and embellished in successive periods after the Middle



Photo 1

Detail of the antique 'sestino' terracotta tiles after been restored and grouted with KERACOLOR LARGE GRAIN

Photo 2

Beginning of the restoration work to the plasters; scaffolding is erected

Photo 3

Work in progress



PHOTO 1

PHOTO 2



Ages.
In the book

"Quattro chiacchiere sulla storia di Péccioli" (Bartoli, 1973) we read "the original building is of the medieval period with modifications carried out in the XVIII-XIX century. Public office of the chief magistrate, already in the XVI century, maintaining its public use as the office of the Gonfalonieri in the epoch of the grand duchy of Tuscany; it was the office of the Prefecture until 1923". Actually a part of the building continues to maintain a public role, hosting the office of the town council.

Technical-structural characteristics

The building is composed of three floors besides the mezzanine.

Structurally the perimeter walls are of mixed masonry and the floors in wood, iron and tile.

The roof frame, double pitched, is in wood with a covering mantle in plain and curved roofing tiles. Internally the rooms are characterized by barrel vaults on the lower floor with the exception of the entrance hall which has a wooden ceiling. The entrance hall is of remarkable artistic importance, on the walls can be seen the remains of frescoes that give the idea of more extensive paintings underneath the wall paint covering; the workmanship of the wooden ceiling is of a high quality. The walls, for the major part plastered, are in a poor state of conservation. In general the state of conservation is very poor, to the extent of real degradation as far as the condition of the internal courtyard and the rooms adjacent to the main passageway.

Work criteria

The project work criteria, as requested by the council administration, were

PHOTO 3



aimed at enhancing the civic function that in part the Palazzo Pretorio already had and to restore those historical-urban contents of which it had been partially deprived.

Each projectual choice therefore, had to take into consideration and fully respect the original building, structure, materials and building techniques.

The interior of the hall has been freed from partitions and the grit flooring has been substituted, inserting antique 'sestino' terracotta tiles, traditionally laid and grouted with KERACOLOR LARGE GRAIN, a prepacked cement mortar. The original wooden ceiling has been retained in the parts that were in a good state of conservation and replaced in the deteriorated parts.

The flooring of the passageway and of the courtyard have been replaced; in particular the courtyard has had installed a stone sheeted cobbled surface. Still in the courtyard, in order to recreate a more intimate and secluded environment, a trellis cover has been created that helps to screen the courtyard from the windows of the private flats above.



PHOTO 7



PHOTO 4

Photos 4 and 5
The progress of
restoration to the
masonry stone piers
with
MAPEANTIQUE
MC and a detail close-
up

Photos 6 and 7
The finished work:
the particular
building technique
has allowed the rooms
to regain their antique
splendor



PHOTO 5



PHOTO 6



Consolidation and improvement

Moreover the intervention required the restoration of all the internal plaster that, as already said, was badly degraded. The choice has fallen to the MAPEANTIQUE line that guarantees a mechanical

performance similar to the antique mortars of old, an insensibility to chemical and physical aggressions and with a dehumidifying effect. After having removed the incoherent material, the restoration of the masonry stone piers has been carried out with MAPEANTIQUE MC, a light dehumidifying mortar for historic buildings. The finishing both of the entrance hall and of the "Council hall" on the first floor, has been carried out with lime putty. The façades of the courtyard have been cleaned by reclamation and reconstruction of the wall weave through the "sew and unsew" technique, sanding and finally surfacing with the relevant protective treatment of transparent paint. Today the rooms of the Palazzo Pretorio, restored to their antique splendor, are to become the Library of Péccioli.

Technical data sheets of the products mentioned in this article are contained in the binder Mapei number 1 "Ceramic line" and number 3 "Building line".

TECHNICAL DATA

Project: Palazzo Pretorio,
Piazza del Popolo, Péccioli (PT) Italy

Year of construction: 1100 AD approx.

Year of restoration: 1994/95

Designers: Studio Associato
Arch. Catarsi, Arch. Alfonso Guiggi,
Geom. David Casati

Contractor: F.lli Fegattilli

Product used for the restoration:
MAPEANTIQUE MC

Product used for laying the terracotta tiles:
KERACOLOR LARGE GRAIN



RENOVATED WITH RESILIENTS

PVC, RUBBER AND NON-WOVEN TEXTILES HAVE BEEN CHOSEN FOR THE FLOORINGS AND COVERINGS IN THE WARDS, WAITING ROOMS, OPERATING THEATERS, AUDITORIUM AND ACCESS AREAS OF THE "CLINICA DEL LAVORO" IN PAVIA (ITALY).

by Paolo Giglio - Photos by Davide Ottolini



PHOTO 1



PHOTO 2



Photo 1 and 2
The application of ADESILEX F57 on the concrete steps of the auditorium and the successive laying of the non-woven textile.

Photo 3
Detail of the completed auditorium steps.

The Salvatore Maugeri foundation was set up in 1865 as the "Clinica del Lavoro" (Occupational Health Institute), with the purpose of operating in the institutional areas for the protection of occupational health and rehabilitative medicine. Today it represents a valuable asset in the environment of private institutes. Its activity is divided between prevention and actual treatment. In the first instance, identifying and preventing the risks attached to manufacturing activities, in the second, recovering the functional and aptitude capacities of people with neuromotor disabilities, cardio-respiratory and chronic pathologies, favouring social-productive rehabilitation of the disabled and preventing any handicap. The welfare activity supplies a fund of necessary information to support research, which develops along the lines of these themes: occupational and environmental risks in productive activities, rehabilitative neuromotor medicine, rehabilitative cardio-angiologia, rehabilitative pneumologia, rehabilitation of other pathologic disabilities and occupational and rehabilitative ergonomics.

Philosophy of the project

"Beautiful, functional, complying with the regulations in use, have been the guiding lines that have inspired the refurbishing project for the interior of the Clinica del Lavoro di Pavia" - declared the designer and Works Director Eng. Michele Calvi.

PHOTO 3



The works involved the floor and wall coverings in the wards, waiting rooms, operating theaters, auditorium and access areas.

Auditorium

The room is intended for conferences, meetings and cultural entertainment. The concrete steps have first been carefully surfaced

PHOTO 4



PHOTO 5



PHOTO 6



Photo 4
ADESILEX VS45 being spread on
the gypsum-board

Photo 5
The sheets of PVC being applied
after heating and smoothing

Photo 6
Corners and edges being treated
with particular care for a finish that
corresponds better to the
requirements for total hygiene.

Photos 7 and 8
Details of the finishing in the wards

cleaned, eliminating all the incoherent parts of the support (dust, efflorescence, small stones), and then the surface has been treated with the fixative PRIMER G, an isolating primer in water dispersion that optimizes and guarantees perfect adhesion of the levelling compound to the concrete support. Levelling was carried out using PIANOCEM M. In this case PIANOCEM M has been used to finish the concrete for both the riser and the step. The product has been used with a variable thickness from 1 to 3 mm and then sanded to eliminate all the ripples caused by the trowelling of the material. The non-woven textile Tapison made by Sommer has been used to cover the stairs. For the installation of this material ADESILEX F57 has been used, an adhesive with a base of synthetic resins, that, thanks to its adhesive tenacity and initial grip, allows the execution of overlaps during installation, and the moulding of the material during the working phase. In the photographs it is possible to see the different phases of installation: the application of ADESILEX F57 first with trowel nº3 (photo 1) and subsequently the cutting and the smoothing with a peen hammer of the Tapison flooring. In this way an excellent job is done, starting from an adequate and correct preparation of the support and of the installation.

The coverings of the wards and of the motor recovery rooms

For the coverings of the wards and motor recovery rooms Mipolam 200 pvc sheets, have been used. The material has been applied on gypsum-board; the joints between the individual sheets have been sealed with gauze in order to guarantee the continuity of the support.

After having applied a coat of PRIMER G, a primer with a base of synthetic resins in water dispersion, on the joints of the panels, the installation has proceeded with the spreading of ADESILEX VS45, an acrylic adhesive in water dispersion, directly onto the gypsum-board and then onto the pvc sheet.

The joints of the sheets have been heated and opportunely smoothed. This technique was made indispensable due to the quite severe atmospheric conditions; it was opportune to soften the material, by means of heating it with a blowtorch, in order to make effective its grip also on the joints.

PHOTO 7



PHOTO 8



Subsequently the joints have been welded during installation anyway. The process of heating the material has been carried out also in the corners and on the edges. Thanks to these techniques, the resulting finish is excellent, above all along the joints. This is of considerable importance not only from the aesthetic point of view, but above all from the functional point of view, considering the particularity of the place and its requirements for total hygiene. The pvc wall covering has been done in different shades so as to divide the wards, corridors and waiting rooms. The different colour shades were requested by the Works Director and were punctually carried out by the company supplying the material.

The flooring

The substrate on which the flooring was installed, also in this case Mipolam 200 pvc, is of a anhydrite base.

PHOTO 9



PHOTO 10



PHOTO 11



Because of this specific type of substrate it is indispensable to check the level of humidity before proceeding with the installation: in fact it is absolutely essential that there is no rising damp; moreover the humidity of the support must be below 0,5%; these two requirements have been verified and monitored directly on the building site by means of a carbide hygrometer. The installation work was preceded by surface sanding of the anhydrite surface, a recommended and essential operation, according to the regulations in force. The installation then proceeded to the spreading of a primer onto the anhydrite, PRIMER G, used

for the purpose of separating and avoiding the interaction in time between binders with a base of gypsum and with those with a base of cement; in fact the spreading of PRIMER G anticipates the cement leveller that will follow after a few days. PRIMER G is applied with a spreader; thanks to its light blue colouration, the primer permits the verification of its spreading and priming on the whole surface. The substrate treated like this, has then been refinished with a leveller. For this operation PIANOCEM M has been used, a cement based leveller, that has had added, in the preparation phase, LIVIGUM, an additive for cement mortars and levellers (at a total of approximately 2 kg per 25 kg of PIANOCEM M). The installation of the pvc has been carried out with ADESILEX V4, a water dispersion adhesive, suitable for the installation of vinyl flooring on absorbent supports. For the Radiology ward, Colorex EL conductive vinyl, from the company Forbo, has been used for the flooring. After having followed the same method of preparation for a anhydrite substrate already explained, its installation was carried out with a water dispersion adhesive, ADESILEX V4 CONDUCTIVE, while for the installation of the copper strips the neoprene adhesive ADESILEX VZ CONDUCTIVE was used. The application of the flooring has followed different phases: from the spreading of the glue to the softening of the pvc using blowtorches, and passing finally to the smoothing of the installed flooring. The finishing operations of the flooring have been completed by the preparation of the joints and their successive sealing with pvc beading. As far as the Radiology ward is concerned, all the necessary techniques for the installation of conductive flooring have been carried out.

The stairs

Finally we move on to analyse the technical solutions adopted for the installation of the covering for the stairs, for which the use of rubber Rollstep, from the company Artigo, was planned. The stairs in rough concrete were suitably levelled and shaped with NIVORAPID, a quick setting and drying cement based thixotropic levelling mortar. NIVORAPID is a very versatile product, it can be used both horizontally and vertically, and moreover it allows, in

PHOTO 12



PHOTO 13



PHOTO 14



PHOTO 15



Photo 9
A flight of stairs smoothed and moulded with NIVORAPID

Photo 10
After being spread on the backing of the rubber sheets, ADESILEX LP is applied to the NIVORAPID cement support

Photo 11
A phase in the installation of the rubber

Photo 12
A phase of the application of ADESILEX V4, which is followed by the laying of the pvc sheets

Photo 13
The sealing of the sheets using pvc beading

Photos 14 and 15
Particulars of the finishing of the joints

Photos 16, 17 and 18
Images of the finished work in diverse environments

The technical sheets of the products mentioned in this article are contained in Mapei binder number 2 "Resilients and wood line".



the first phase of setting (20/30'), moulding by plastering trowel or damp sponge, ideal for forming corners and rounding off as required, without jeopardizing the mechanical resistance, optimal after about 5/6 hours. For the installation of the rubber ADESILEX LP, a contact adhesive, has been used. The photographs show some phases of the installation of the adhesive: on the backing of the rubber sheets and on the NIVORAPID cement support. Also in this case a system of double spreading the adhesive has been followed: in fact, for a perfect outcome to the operation, it is indispensable that the adhesive is spread in a continuous way on both the supports. The waiting time necessary for the solvents to evaporate varies, depending on temperature.

Once the adhesive is superficially dry, the installation of the rubber can proceed followed by its smoothing onto the flat and rounded corners of the steps. Correct application, combined with suitable installation technology and trained and qualified personnel, have allowed a high level of precision and finishing to be reached, even down to the smallest detail. In this way a work of great quality has been realised, to which must be added the appreciation relating to the validity of the management of the organizational phase and of the site works. □

PHOTO 16



PHOTO 17



PHOTO 18



TECHNICAL DATA

Project: Clinica del Lavoro
"Maugeri Foundation", Pavia, Italy

Year of construction: 1995-1996

Contractor: MC3 di T. Marini & C.,
Milano, Italy

Designer and construction supervisor:
Prof. Eng. G. Michele Calvi

Wall and floor coverings:
pvc: Mipolam 200, HT Troplast AG
non-woven textile: Tapison, Sommer
rubber: Rollstep, Artigo
conductive vinyl: Colorex E1, Forbo

Products used for the installation:

PRIMER G
PIANOCEM M
ADESILEX F57
ADESILEX VS45
LIVIGUM
ADESILEX V4
NIVORAPID
ADESILEX V4 CONDUCTIVE
ADESILEX VZ CONDUCTIVE
ADESILEX LP

PHOTO 1



THE WORK OF WIDENING THE PORT, EXTENDING THE ALREADY EXISTING MOLE AND THE CREATION OF AN ARTIFICIAL BREAKWATER BARRIER HAVE RETURNED THE PORT OF SANTA MARIA DI LEUCA (ITALY) TO A NATURAL AND SAFE PLACE FOR SMALL BOATS.

by Giuliano Traversini* and Ernesto Erali

TETRAPODS FOR DEFENCE

In the land of the Salento, where the Mediterranean sun illuminates and brightens every colour, there is a privileged "emporium" in the history of commerce, culture and custom. There is the port of Santa Maria di Leuca, uncontaminated landing place with its beautiful landscape and geography. A natural landing place that the council of Castrignano del Capo (LE), in their tourist development programme, has wanted to protect with a project that respects and safeguards the environment. The works, once the project was approved and financed, planned for the widening of the port and, amongst other work to realise, also the extension of the already existing mole, a load bearing structure of material and elements of various forms and dimensions, for the creation of an artificial breakwater barrier.

The execution of the work lasted approximately two years and on the occasion of its inauguration, in July 1995, a celebration was organized on a national level that attracted large numbers of period boat enthusiasts, creating a particular atmosphere and an enchanting spectacle.

Actually Santa Maria di Leuca, as well as accommodating the local fishing fleet, is a secure and natural harbour for those boats that from the centre of the

Mediterranean are directed towards nearby Greece and the eastern countries.

Avant-garde technology in defence of the port

Barrier tetrapods

The artificial breakwater barrier has been constructed using special concrete tetrapods that, due to the short time available for the undertaking and the confined space of the construction site, had to be rapidly placed in the sea. To solve these problems, the most significant being insufficient storage space, a concrete was necessary that allowed the breaking of the moulds 16 hours after the pour, and successive moving after 48 hours. The structure of the tetrapod, taking into account the dimensions (20 m³ of volume for approx. 40 t weight), was under considerable mechanical stress. The accurate mix-design of the cement

PHOTO 2



* PR officer of Colacem SpA, Gubbio (PG)

Photo 1
Site storage of the breakwater elements

Photo 2
Moving the tetrapods

PHOTO 3



PHOTO 4



PHOTO 5



PHOTO 6

Photo 3
Class of consistency of concrete S3 semifluid.

Photos 4 and 5
Detail of a zone of the artificial barrier

Photo 6
Placing of the concrete, for the breakwater structure, in the water



mixture, prepared by Colabeton technicians in collaboration with the works management, has permitted the achievement of elevated production (up to 400 m³ per day) and high mechanical resistance with short curing times. The necessity of improving the mechanical performance of the concrete and accelerating the kinetics of hydration

of the cement required the addition to the cement conglomerate of the enhanced hyperplasticiser MAPEFLUID IF328. The additive, dosed at the rate of 1-1,5 lt. for every 100 kg of cement, has made possible the containment of the W/C (water/cement) ratio within a maximum value of 0,50 and the achievement of a S3 semifluid class of consistency, considered to be suitable for the correct installation and compaction of the concrete.

All the operative choices adopted, including that relating to the utilization of an aggregate with a maximum diameter of 40 mm, have allowed production of a conglomerate with good characteristics of impermeability and cohesion.

PHOTO 7

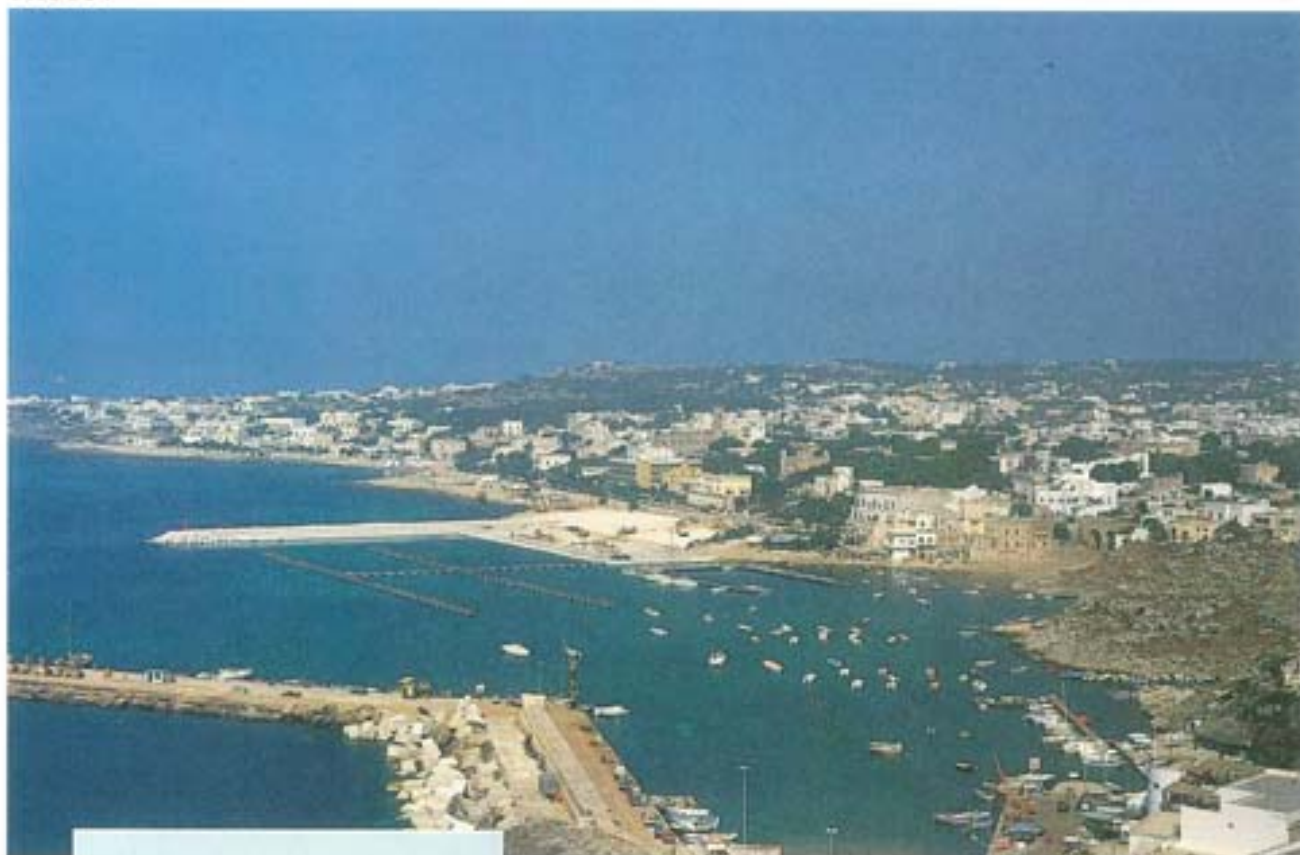


Photo 7
Panorama of the port
of Santa Maria di
Leuca after the
widening work.

Load bearing structure

Moreover, inside the port a load bearing structure has been built in order to alleviate the force of the marine currents; the proportioning of the concrete has been formulated taking into account that installation had to be effected directly into water and that resistance to corrosion and scouring had to be guaranteed.

Scouring has been prevented thanks to the adoption of a W/C ratio below 0,50, an elevated class of fluidity and a granulometric assortment slightly over grit. Also in this specific mix it has been possible to reconcile the low W/C ratio and high fluidity of the mix, by using the superplasticiser additive MAPEFLUID N200 (1 lt/100 kg of cement). □

The technical sheets of the products mentioned in this article are contained in Mapei binder number 3 "Building line".



TECHNICAL DATA

Project: Extension of the port of Santa Maria di Leuca - Castrignano del Capo (LE - Italy)

Year of construction: 1994-1995

Client: Council of Castrignano del Capo (LE)

Contractor:
Temporary consortium of:
Dott. Carlo Agnese S.p.A.
Edilizia Ligure
Sicem S.r.l.

Construction supervisor: Eng. Primo Stasi

Jobsite supervisor: Geom. Enrico Cella

Concrete supplier: Colabeton S.r.l.

Products for the cement conglomerates:
MAPEFLUID IF328
MAPEFLUID N200



This product is available in large quantities or in bulk tanks.





GIORGIO SQUINZI IS FEDERCHIMICA'S NEW PRESIDENT

AN INDUSTRIAL POLICY FOR FEDERCHIMICA,
ITALIAN FEDERATION OF THE CHEMICAL
INDUSTRY.

At the Federchimica's congress, held last June 2nd, Mr Giorgio Squinzi was elected - with the overwhelming majority of 99% of votes - as the Federation's new President for the 1997-98 period; he replaces Mr Benito Benedini, who became Assolombarda's President last June 9th. Immediately after his election, President Squinzi outlined the agenda for his industrial policy - which relates to three areas: environment, innovation, and internationalisation. "A tailor-made industrial policy - said Squinzi - for each family of companies belonging to Federchimica. Helping the large companies to play a leading role in the global market and driving the industry's development means supporting new investment projects and revamping existing sites. On the other hand, support to multinationals must rely on the promotion of policies to attract foreign investment, which has always been lacking in Italy, whereas support to SMEs (Small Medium Enterprises) should help them grow in size".

The new President, Mr Squinzi, also highlighted the importance of leaner procedures for the opening of new plants, and of industry development plans. He also pointed out that Federchimica believes that growth, development and new authorisations ought to be managed by the

administrations of Provinces and Municipalities, whereas the Regional Authorities should run the "promotional offices for industrial initiatives and the co-ordination of authorisation procedures". Finally, Mr Squinzi reported on the upcoming contract renewal, which is expected to take place by the end of the



year. "The major drop in the inflation rate forces us, more than in the past, to seek a contract renewal which is compatible with the development and competitiveness needs of organisations in Europe, being aware that growth is the only way for the chemical

industry to contribute to higher employment levels - as against, for instance, frequently-mentioned reductions in the working hours. The flexibility of salaries in connection with the organisations' productivity and profitability, the possibility to manage labour relations and working hours so as to comply with the real production and market needs, and a higher commitment in training workers, are the issues on which we ought to find a greater and greater consensus with our counterparts, both at the national and at the company level". □

*Benito Benedini
Federchimica's
past President,
Guido Venturini,
Federchimica's
Director-General,
Giorgio Squinzi,
Federchimica's
new President and
Stefano Micossi,
DG III Industry
Director-General
at the European
Commission*

THE HABSBURG EMPIRE



This time it is Italy that has conquered the Habsburg Empire. In a metaphoric sense obviously. Mapei has in fact "conquered" in a few years firstly the Austrian market, and then those of the Czech Republic and Hungary, and is now preparing to extend its "dominion" to Slovakia and Russia. After all, as Oscar Zannoni, President of Assopiastrelle, has recently affirmed during the inauguration of the Cersaie trade show in Bologna (Italy), with regard to markets, actually the new frontier is represented by the Eastern European countries. The manager of Mapei Austria, Günther Joch, explained to us how the idea was born of creating Mapei Austria, what the characteristics of the Austrian market and the countries of the East are and what the future prospects are.

PHOTO 1



*Photo 1
Günther Joch, in the photo, relives in these pages the beginning and development of Mapei in Austria and Eastern European countries and presents us with the new production centre at Traismauer*

How was the idea born of opening a Mapei subsidiary in Austria?

It is a curious story, I will tell you.

A company in Vienna was looking for a new supplier of adhesives that had considerable experience and was capable of satisfying the needs of a company with over 70 installers of ceramics.

The manager of this company, responsible not only for the purchase of ceramic tiles from Italy, but also of their installation, was me. I knew that the ceramic and adhesives manufactured in Italy,

coupled with the Austrian culture of installation, were certainly a combination that guaranteed positive results. In 1979, during a meeting with Dott. Squinzi, the idea was born of distributing Mapei products in Austria and, being important for Mapei to support sales with technical assistance, it was logical to establish a Mapei subsidiary in this country.

Are you saying then that the opening on the Austrian market was not only a commercial, but also technical choice?

This decision has opened the door to a different market to that of Italy. In Austria ceramic installers form a sector on their own, they do not have anything to do with installers of resilients or parquet or with





PHOTO 2

The head office and production centre at Traismauer have grown according to the needs of the market. To the first production buildings, the office area and the laboratory (photo 2) followed the first expansion of production in 1990 (photo 3), which in turn was followed by the expansion of the production area (photo 4) with new silos (photo 5) and warehouses (photo 7 on the next page). In photo 6 a panorama of the head office complex as it is today.

construction companies, but are professionals united in autonomous organizations. The Austrian installer, like the German one, learns the "trade" working for three years as an apprentice, following a suitable school, and finally taking an examination that authorizes him

PHOTO 5



to be called an "installer of ceramic tiles".

After another three years of school, with rather strict examinations, he can assume the title of "Fliesenlegermeister", that is master installer of ceramic tiles.

The method of installation is also different: we can say that in Italy, as far as vertical wall coverings are concerned,

installation is carried out from the bottom towards the top with grouting similar to marble. On the other side of the Brennero border instead, installation is from the top towards the bottom with grouting, minimum, of 2-5 mm. Therefore Mapei has managed to enter a completely different market, made up of competent professionals, a market already well catered for by many local and German producers, a market prepared to receive the advanced technology of this century.

Since 1979 to today there have been many changes for Mapei Austria and not only geographically; can you describe them for us?

PHOTO 3



PHOTO 4



PHOTO 6



The subsidiary started operating in 1980, initially with a warehouse of 600 sq.m, but already the following year it was necessary to enlarge capacity and therefore, in 1982, operations were transferred to a larger warehouse in the vicinity of the Schönbrunn castle. Moreover from the start it was clearly indispensable, in order to serve the market better, to open other warehouses that would function as Profit Centres, able then to supply the complete range of Mapei products and to offer technical assistance to the customers. The motives that have directed Mapei to not entrusting this work to wholesalers, as has happened in a large part of the world, are several. The proximity, both to the tile producers of Germany



PHOTO 7



The new spacious warehouses (photo 7) allow storage of all the products of the Mapei range, also those that are imported directly from Italy.

The Austrian production is concentrated on products for the laying of ceramics and on some special building products (photo 8).



PHOTO 8

and of Italy, has allowed the single installers to commence importing materials directly from the producers.

In this way the wholesalers in Austria have gradually lost importance because, although willing to hold a certain stock, they are not committed to supply technical assistance. This system of distribution, without doubt unusual, has brought about a considerable increase in sales, that has determined the necessity of also constructing a productive unit in Austria. Therefore in 1988, at Traismauer in the vicinity of Vienna, a factory with the capacity of about 6,000 tons a year was established. At the same time as the development of the markets it has been necessary to increase production capacity of the factory, which now manages to produce 40,000 tons a year; but already a new plant and warehouse is being built which will increase capacity to around 140 thousand tons a year. Production is concentrated on products for the installation of ceramics and on some building specialties. The other products, that complete the traditional Mapei range, up to now are imported from the Italian parent company. In 1996 the forecast turnover of Mapei Austria will reach 200 million shillings. With the fall of the Iron Curtain in '89, Mapei started to examine the situation in the countries of Eastern Europe and resulting from this, the branches in Budapest and Olomouc were

born. The difficulties to overcome were without doubt complex: any sort of market structure was missing, the currency was not convertible, the system of installation was traditional and so on. In spite of all this, with much enthusiasm and determination, in a relatively short time, Mapei managed to establish itself; in 1994-95 in fact it has been possible to inaugurate the new head offices in Budapest, Olomouc and Prague. A new associated company is planned for Slovakia, with the head office in the vicinity of Bratislava, and an information centre in Moscow, with a suitable warehouse. In fact in Russia the biggest problem is not the economic situation but distance.

From a technical point of view is the Austrian market different from that of the single countries of the East?

Both the Czechs and Hungarians are willing to learn the new techniques having already come across them in diverse prestigious projects. In fact first they must import qualified skilled workers in order to achieve a quality of work at a European level, now instead they are trying to obtain the same results with their existing personnel. Russia is different, both for its long

isolation from Europe and the enormous distances, and for its philosophy. The Russians in fact are rather suspicious of everything that comes from the West; we will need therefore to convince them that modern technology is at their service and that it helps to resolve problems.

Moreover it will be necessary to instruct the technicians and workers on how to use the Mapei products.

How many employees are there in Austria and the branches in the East?

In Austria there are 50 employees, in Hungary 13 and in the Czech Republic 20 between workers and management.

What is the relationship with the associate company Mapei Germany?

We have a commercial relationship with Mapei Germany; our Traismauer factory exports to Germany products that it produces. Technically there is not much difference between the two countries and the standards are similar.

You have mentioned the Do-It-Yourself (DIY)

Mapei Austria

was founded in 1980.

Today it has its head office and factory, at **Traismauer**, near Vienna, and two warehouses at **Gunskirchen** and **Graz**.

In 1990 it opened two branches in the countries of the East, at **Budapest** in Hungary and at **Olomouc** in the Czech Republic and successively one at **Prague**.

For the near future the creation of a new associate company in **Slovakia** and an information centre with a suitable warehouse in **Moscow** is planned.



PHOTO 9



To the Austrian market have been added also those of Eastern Europe after the fall of the Iron Curtain in 1989. In photos 9 and 10 the new Mapei head office in the Czech Republic at Olomouc, managed by Zdenek Runstuck, 6th from the left, and of Mapei Hungary in Budapest (photo 11 and 12) managed by Bela Markovic (in the 2nd row, 3rd from the left).

PHOTO 10



What is the relationship between housing construction and infrastructure construction (hotels, supermarkets)?

I think that housing construction actually has priority. It is noted that in Vienna, for example, there is a shortage of over 50,000 apartments. The situation is even more tragic if you consider the countries of the East. There is need to add however that the Czechs and the Hungarians are recovering strongly, while in Russia we are still at the beginning.

market; how important is it today and is Mapei represented?

The DIY market represents about 50% of the consumption of tiles. For our sector exact totals do not exist, but you could say that the percentage is approximately 30% with regard to the Baumarkt selling "simple" products, while the professionals buy a complete system, such as Mapei can offer. We are represented in DIY chains that specialize in ceramic products.

The 1996 market and the prospects for the near future are taken up mainly with new construction or restoration?

In this period it is difficult to give exact answers. In Austria there is the famous Sparpaket, according to which the government reduces to the bare minimum public expenditure, including also the building sector, both for public investments and for incentives to the private sector. I reckon anyway that in 1997 private and public investments and restorations will increase. Since Austria entered the EC industrial investments have increased; large international companies have in fact chosen Vienna as their base to start business with the East European countries. Also restoration will increase simply because of the fact that, in the past, it has been neglected and this phenomenon will be more emphasized in the East European countries.

And regarding the large scale construction market (bridges, roads, dams, etc.)?

In Austria we will have, in the near future, little to look forward to. There will probably be investments to safeguard the environment such as purification plants and refuse incinerators.

Returning to the branches in the countries of the East: how do you qualify this market? How do you think it will evolve?

At the moment we have some estimates concerning the ceramic sector. Hungary consumes about 11 million square metres while the Czech Republic about 13 million square metres. Traditional installation covers about 50%, with a tendency to diminish. Our subsidiaries are by now well

PHOTO 11



PHOTO 12





PHOTO 14

Today Mapei's production is present not only on building sites where there is the laying of ceramics, wood and resilients, but also on the large projects with special building products (in photo 13 and 14 some phases of work of the A1 Ring Austria motor racing circuit)

developed and the initial difficulties have been overcome. The Czechs are economically more advanced; the Czech Republic besides is a country with a great industrial tradition, while Hungary is an agricultural country therefore development is a little delayed.

The Italian tile producers look with great interest on these markets: what do you think about it?

They have reason to. These countries must recoup more than 50 years, they are in the same situation Austria was in when the Allies left the country in 1955. Even more interesting is Russia, a market of over 500 million inhabitants with a building industry to be rebuilt. On the occasion of the building industry show held in Moscow at the beginning of September, we have had contacts with the local industry that confirmed that the Moscow market, which is at the centre of the Russian economy, consumes at the moment 500,000 tons of pre-mix mortars (also plasters and similar) and it will develop within a few years up to 5 million tons. Also in these countries Mapei dedicates attention to training: at whom is it directed? Training is very important for us. We must carry out training for engineers, technicians and for the workers of various companies and also following on with training for specialised companies that are being formed. Generally we invite them to Traismauer or we go directly to the project sites. □



The Italian ceramic in Eastern Europe

The Eastern European countries have absorbed last year 29,2 million square metres of Italian ceramics compared to a consumption that, only 24 months before, was almost half: 15,3 million square metres with a value of 178,2 billion lira. For each single country we have noticed that, even with a wide spread presence in all the countries, the first three markets - Poland, Hungary and Russia, cover around 50% of the purchases.

"The sustained rhythms of growth of the Eastern European countries, the increase in consumption of Italian tiles thought to be for 1996 around 45-50% - said Oscar Zannoni, chairman of Assopiastrelle, - has persuaded the Association to intervene in support of the single companies with an integrated plan of new promotional activities, amongst which an advertising/promotional campaign in the main media, actually directed at the diffusion of knowledge of Italian tiles". The concept at the base of the campaign is that of linking the actual production of ceramic tiles, that also the consumers of the Eastern European countries have recognized for their quality and prestige, to the incomparable heritage of culture and beauty that characterise the architecture of our country, through the proposal of an ideal and refined "live the Italian style". The countries selected for the implementation of the campaign are the two most important of Eastern Europe, Poland and Hungary, and the market that presents the highest development potential, Russia. The campaign will start the last months of 1996 and will be articulated in the press and television media in a diversified way in the three countries, according to the different situations and opportunities present.

Great names also for the spot realized by the production house Filmgo directed by Cesare Monti Montalbetti, who has signed many other important advertising campaigns, and for the photographs used in the advertising pages, the work of Giancarlo Maiocchi. (The above photo shows a page of the campaign).



EXPORT OF ITALIAN CERAMIC TILES TO THE MAIN EASTERN EUROPEAN COUNTRIES

| Country | Year 1993 | | Year 1994 | | | | Year 1995 | | | |
|------------|------------|-------------|------------|-------------|---------|---------|------------|-------------|---------|---------|
| | Sq/m | Value | Sq/m | Value | Δ% Sq/m | Δ% Val. | Sq/m | Value | Δ% Sq/m | Δ% Val. |
| Poland* | 5.399.363 | 52.212.949 | 4.398.118 | 44.894.013 | 18,50 | 28,12 | 8.325.841 | 91.651.142 | 20,13 | 37,01 |
| Hungary | 3.649.372 | 44.158.948 | 3.423.627 | 48.276.456 | 48,62 | 54,62 | 5.550.597 | 70.292.660 | 2,34 | 2,95 |
| Russia | 452.942 | 7.472.231 | 1.207.848 | 26.363.326 | 193,16 | 252,82 | 2.269.543 | 46.980.595 | 78,45 | 78,13 |
| Slovenia | 982.811 | 14.319.265 | 1.457.680 | 21.102.186 | 48,32 | 47,37 | 2.225.570 | 32.800.862 | 53,26 | 55,44 |
| Czech Rep. | 1.502.216 | 19.374.133 | 1.895.218 | 25.150.118 | 26,14 | 30,49 | 2.176.459 | 31.115.472 | 14,84 | 23,72 |
| Croatia | 805.443 | 10.681.838 | 1.580.641 | 21.187.452 | 86,31 | 99,85 | 2.168.641 | 29.993.359 | 44,38 | 41,56 |
| Albania | 181.328 | 1.385.213 | 700.587 | 4.259.706 | 286,26 | 207,51 | 1.215.266 | 8.141.321 | 144,90 | 114,60 |
| Slovakia | 1.028.728 | 12.868.586 | 929.570 | 12.400.015 | -8,67 | -2,09 | 1.178.118 | 15.524.871 | 25,10 | 23,21 |
| Romania | 416.979 | 3.664.149 | 789.747 | 8.266.478 | 89,40 | 123,97 | 1.155.085 | 15.187.994 | 46,26 | 85,07 |
| Bulgaria | 444.982 | 5.036.607 | 482.788 | 6.876.575 | 8,72 | 36,52 | 546.094 | 8.263.670 | 12,82 | 20,17 |
| Ukraine | 138.541 | 2.969.723 | 242.359 | 3.429.012 | 79,52 | 66,16 | 468.472 | 6.923.768 | 88,63 | 101,33 |
| Macedonia | 110.983 | 1.894.438 | 333.074 | 4.712.965 | 290,07 | 178,14 | 281.710 | 4.618.474 | 14,62 | 27,70 |
| Estonia | 71.132 | 954.946 | 164.729 | 2.183.656 | 131,58 | 129,72 | 292.131 | 4.346.495 | 77,95 | 89,02 |
| Latvia | 19.290 | 351.819 | 152.010 | 2.425.016 | 673,56 | 592,24 | 263.124 | 2.936.217 | 70,57 | 61,67 |
| Lithuania | 29.836 | 481.267 | 188.839 | 2.574.825 | 566,44 | 435,01 | 259.912 | 4.194.840 | 20,71 | 42,92 |
| Others | 92.528 | 1.684.922 | 141.741 | 2.256.173 | 52,19 | 63,58 | 199.308 | 2.736.590 | 40,54 | 35,57 |
| TOTAL | 15.126.774 | 178.231.182 | 22.156.557 | 279.028.372 | - | 44,54 | 29.281.171 | 379.888.330 | 32,16 | 36,15 |

*In 1994 2.181.489 Sq/m with a value of 6.512.604.000 lira in support of third parties are not included

Source: Data processing by Assopiastrelle from ISMAI data

HEALTHY BUILDINGS: THE ROLE OF ADHESIVE MANUFACTURERS

"NEW FRONTIERS IN THE DESIGN OF MATERIALS AND LIVING SPACES IN LINE WITH ENVIRONMENTAL NEEDS" IS THE MAPEI COMMITMENT TO IDENTIFY AND DEFINE A METHODOLOGY OF CONTROL FOR ADHESIVES FOR FLOOR AND WALL COVERINGS.

by *Roberto Leoni*

THE DEVELOPMENT OF CHEMISTRY HAS BROUGHT A GENERAL USE OF SYNTHETIC MATERIALS FOR FURNISHINGS, UPHOLSTERY, CARPETS AND BUILDING COMPONENTS. THESE MATERIALS EMIT INTO THE AIR OF BUILDINGS CHEMICAL SUBSTANCES, SOLVENTS AND COMPONENTS THAT CAN HAVE RELEVANT EFFECTS ON THE HEALTH AND COMFORT OF THE OCCUPANTS.

THE EUROPEAN COMMUNITY INTENDS TO PROPOSE STANDARD PROCEDURES TO TEST THESE MATERIALS BEFORE THEIR COMMERCIAL INTRODUCTION AND TO ESTABLISH A "MARK OF ENVIRONMENTAL QUALITY".

MAPEI HAS RECENTLY INITIATED A COLLABORATION AGREEMENT WITH THE UNIVERSITY OF MILAN, THE OCCUPATIONAL HEALTH INSTITUTE AND THE INTERNATIONAL CENTRE FOR PESTICIDE SAFETY OF BUSTO GAROLFO, DIRECTED BY PROF. MARCO MARONI, FOR THE EVALUATION OF POTENTIAL ENVIRONMENTAL POLLUTION INSIDE BUILDINGS ("INDOOR POLLUTION") DERIVING FROM PRODUCTS USED FOR THE INSTALLATION OF FLOORINGS AND FOR THE REALIZATION OF LEVELLERS, PLASTERS ETC. THIS COLLABORATION DEVELOPS THROUGH JOINT RESEARCHES BETWEEN MAPEI/OCCUPATIONAL HEALTH INSTITUTE AND THE PARTICIPATION AT INTERNATIONAL CONGRESSES. ONE OF THE FIRST REPORTS WITH THE TITLE "USE OF ORGANIC CHEMICALS IN BUILDING MATERIALS: EVOLUTION AND RECENT TRENDS", PREPARED BY PROF. MARONI AND DOTT. LEONI, WAS PRESENTED AT THE 13TH WORLD CONGRESS OF CIB [CONSEIL INTERNATIONAL DU BATIMENT POUR LA RECHERCHE, L'ETUDE ET LA DOCUMENTATION]. A SECOND WITH THE TITLE "NEW FRONTIERS IN THE DESIGN OF MATERIALS AND LIVING SPACES IN LINE WITH ENVIRONMENTAL NEEDS", OF WHICH WE PUBLISH A SUMMARY, WAS PRESENTED DURING THE INTERNATIONAL CONFERENCE IN MILAN "HEALTHY BUILDING '95", ORGANIZED BY THE UNIVERSITY OF MILAN AND THE INTERNATIONAL CENTRE FOR PESTICIDE SAFETY AND SPONSORED BY MAPEI. TOGETHER WITH THESE INITIATIVES MAPEI HAS EMBARKED ON, IN COLLABORATION WITH THE ARCHITECT ANDREA RATTI, RESEARCHER FROM THE UNIVERSITY OF MILAN, THE REALIZATION OF A TEST HOUSE, OR TO BE PRECISE A LABORATORY-HOUSE OF REAL DIMENSIONS, MADE OF MATERIALS RIGOROUSLY FREE FROM EMISSIONS, IN WHICH THE ROOMS ARE CONVENIENTLY ISOLATED FROM EACH OTHER AND FROM THE EXTERNAL ENVIRONMENT AND WHERE CONDITIONS OF VENTILATION ARE STRICTLY CONTROLLED.

FROM THESE IMPORTANT JOINT RESEARCH PROJECTS, A SERIOUS CONTRIBUTION IS EXPECTED FOR THE DEVELOPMENT OF "HEALTHIER" BUILDING PRODUCTS, CAPABLE OF SATISFYING THE GROWING DEMAND FOR ALWAYS HIGHER ENVIRONMENTAL STANDARDS FOR HOUSES, IN THE LOGIC OF CONTINUOUS IMPROVEMENT IN THE QUALITY OF LIFE.

Introduction

The initial use of organic substances as auxiliary building materials is lost in time, when the ancient builder started to mix straw (cellulose) with the clay for the preparation of bricks and walls. These products were the forerunners of the modern fibre reinforced cements with an asbestos base and, today, those with a base of synthetic fibres.

Organic products used "in" and "on" cement

We need, anyway, to arrive at very recent times, to the second half of the 50's, and to the development of synthetic polymers, before having a massive use of organic products in building, both internally of the cements, for the preparation of special mortars, smoothers and levlers, and on the surfaces of buildings in the formulation of protective paints, sealers, adhesives, waterproofing materials, primers, consolidators, for chemically resistant grouts etc. At the base of all these formulations are none volatile polymeric ingredients, that on their own would not contribute to indoor pollution if they were not accompanied by other products with a low molecular weight and elevated vapour tension.

Domestic pollution from polymeric sources

These products are the solvents and plasticizers, biocides and the residual monomers, that, even if sometimes

healthy building
an international conference on healthy building



for announcements and call for papers

organizers

CIB International Council for Building Research, Studies and Documentation

International Institute of Hygiene and Occupational Health

with the scientific and technical support of

University of Milan, Institute of Occupational Health, University of Padua, University of Turin

International Centre for Pesticide Safety

International Centre for Pesticide Safety

present in very small quantities, can create persistent conditions of pollution. To these ingredients must then be added the polymeric fibres that can contribute to environmental dust. Amongst all the ingredients, those that make the largest contribution to environmental pollution are certainly the solvents, the volatile component most widely used.

The role of adhesive manufacturers

With the view of reducing indoor pollution the first objective for the producers of adhesives is therefore clear: to minimize the quantity of solvents used, passing from formulations containing polymers in solutions to formulations with a base of water dispersions and, alternatively, with a base of reactive resins (epoxies, polyurethanes) without solvents. From this point of view the evaluation could be of interest that, internally of Mapei, we have made on consumption of polymers used in Italy today in the formulation of adhesives for floorings, grouts, paints and waterproofing materials for construction, including in the evaluation also the preparation of cement based supports (smoothers, levellers, etc.).

As can be seen in the graph at the side, the larger slices are those relative to acrylic and vinylic polymers and copolymers, followed by the cellulose ethers.

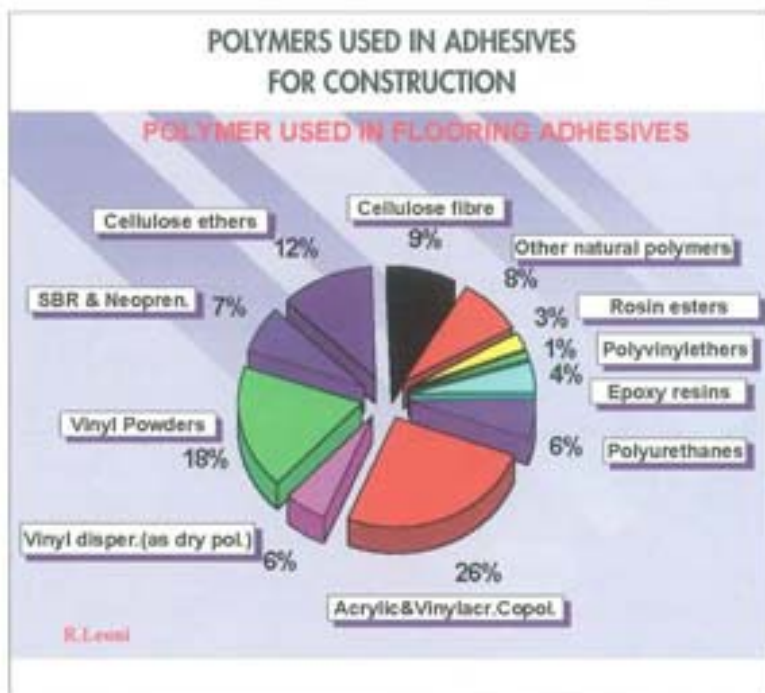
Except for a small quota of acrylic resins in solutions, it deals with polymers destined to be used in water based products. Also the slice relative to SBR and neoprenes refers substantially to latices, with the exclusion of a very small quota of neoprene rubbers in solvents. Cellulose and some other natural polymers (casein, etc.) are constituents of powdered cement products and are also destined for formulations without solvents, as are too the epoxy and polyurethane resins, destined in the great majority of cases for 100% dry products. This data is very significant: in total not more than 10% of these polymers are used in formulations containing organic solvents. It is a very promising picture that, only ten years ago, would have been very different, and shows how the development of safer present day products for the user and for the environment in which they are applied, has now become a priority objective also

for the researchers and manufacturers of building products.

The passage from polymers in organic solvent solutions to those in water dispersions has introduced though a new problem, which is the necessity of protecting water base products from the attacks of microorganisms (bacteria, moulds, etc.) and, therefore, of inserting biocides in the formulations.

Up to a short time ago the protection of

Graphs processed by Mapei R&D Laboratories



flooring adhesives was achieved by the use of pentachlorophenates and formaldehyde, extremely effective products, but today highly undesirable because of their recognized toxicogenic and polluting characteristics. Formaldehyde, in particular, could be capable, because of its physical gaseous state, of contributing in a significant way to domestic pollution. The producers of flooring adhesives more attentive to environmental problems have already for some years, voluntarily substituted these biocides with other, maybe less effective from the point of view of the protection of the adhesive, but certainly less polluting.

Environmental standards for places of habitation

This problem has been recognized and is already regulated or is in the process of being regulated in some

WHERE ARE THE ORGANIC



POLYMERS "IN" CEMENT

History

CEMENT MODIFIERS History

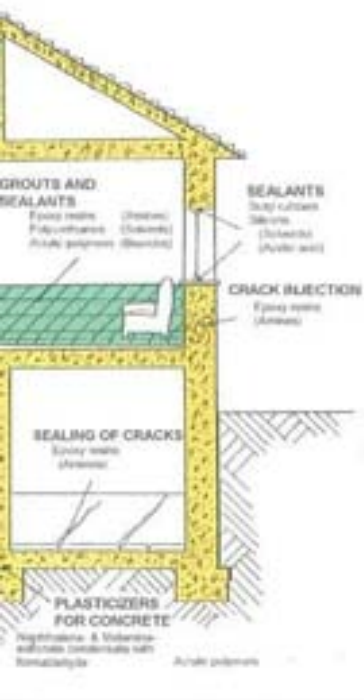
| | |
|--|---------|
| ■ Straw | ? |
| ■ Sulfated animal blood | ca. 0 |
| ■ Asbestos | ca.1900 |
| ■ Natural rubbers | ca.1920 |
| ■ SBR | ca.1950 |
| ■ PVA-EVA-Acrylics-Epoxy | ca.1965 |
| ■ Naphthalene-& Melamine-sulfonate -Formaldehyde | ca.1975 |

POLYMERS "ON" CEMENT

ORGANIC PRODUCTS "ON" CEMENT



PRODUCTS USED IN BUILDING?



countries outside of Europe. An example comes from the State of Washington in the USA, that has introduced strict specifications of purchase regarding the potential of environmental pollution for materials destined to be used in their public offices. These specifications require that products, in normal conditions of use, do not generate in the environment concentrations of formaldehyde above 0,006 mg/m³. Specifications have also been established for the maximum quantity of volatile organic substances (<0,5 mg/m³) and particles (<0,5 mg/m³) released into the environment. A similar initiative comes from the industrial world: still in the USA, CRI, the association of moquette manufacturers, is voluntarily establishing criteria for labelling the products of its members with regard to greater or lesser indoor pollution during their installation.

We have cited, amongst potential pollutants coming from building materials, the fibres present in special mortars and cement based adhesives. In this field the industry has already totally abandoned asbestos, widely used up to the second half of the 1980's and today certainly recognized as a cause of lung tumors, and have substituted it with vegetable (cellulose) or synthetic (polypropylenes, polyamides or acrylics) fibres, remaining, at least for the moment, innocuous.

The role of polymer manufacturers

A separate discussion must be made for the residual monomers that have not reacted inside the polymers (solids, resins or dispersions) used as primary materials in the formulation of adhesives. These possible pollutants are beyond the control, normally, of adhesives manufacturers, inasmuch as the European directives, that regulate the classification and labelling of dangerous preparations (CEE/88/379) and the information reported in the Security Schedule (CEE/91/155), make provision for taking into consideration and for declaring only the toxic substances present in concentrations above 0,01% and those harmful or irritating substances above 1%. Therefore, the characteristics of these polymeric preparations being more or less polluting remains, generally, in the control of the manufacturer of the prime material, and it is to him that the task of developing productive processes capable of minimizing the quantity of non reactive monomers and of marketing "healthier" products is given. The development of products designed for interior use in habitations, today, can no longer exclude an evaluation of their potential impact on air quality, and can not be left to the good will of the individual manufacturer of building products. The research of formulations able to meet the always more pressing requirement of having healthier and more comfortable environments in which to live, needs the development of knowledge and an economic and organizational effort, that only joint action between the scientific world and all the industrial sectors involved will be able to realize, for the common well-being. □

PIANODUR R

A SELF-LEVELLING PRODUCT, CHARACTERISED BY FINE GRADING, THAT ALSO ALLOWS SMOOTHING "TO ZERO" TO PROVIDE A SUPPORT IDEAL EVEN FOR THE THINNEST OF RESILIENT FLOORINGS.

by Francesco Stronati

For the installation of resilient floorings, such as pvc, rubber, linoleum, or textile flooring a support is required characterised by a high level of surface finishing. In fact, because of the thinness of this type of flooring and their deformability, very small imperfections in the substrate are reproduced, in an identical way, on the surface of the finished flooring, as soon as the laying is carried out.

To avoid this problem it is necessary therefore to smooth the supports that are to receive these floorings, even if already characterised by a good surface finish.

Often resilient or textile floorings are installed on new or pre-existing cement substrates which, although perfectly flat, require extra smoothing if only to close their surface porosity. In other cases the installation is carried out on pre-existing ceramic or natural stone flooring; also in this



case it is necessary to spread a thin smoothing layer in order to avoid the joints between tiles being clearly visible on the installed flooring.

To carry out these works it is necessary to be able to have a levelling material, characterised by an extremely fine granulometry, that allows the correction of these small imperfections determining a support perfectly flat.

This smoothing can be easily carried out with PIANODUR R, self-levelling fine grained fast

setting smoothing compound. PIANODUR R is a grey coloured powder, composed of special rapid setting cements, resins and additives according a formulation developed in the Mapei laboratories.

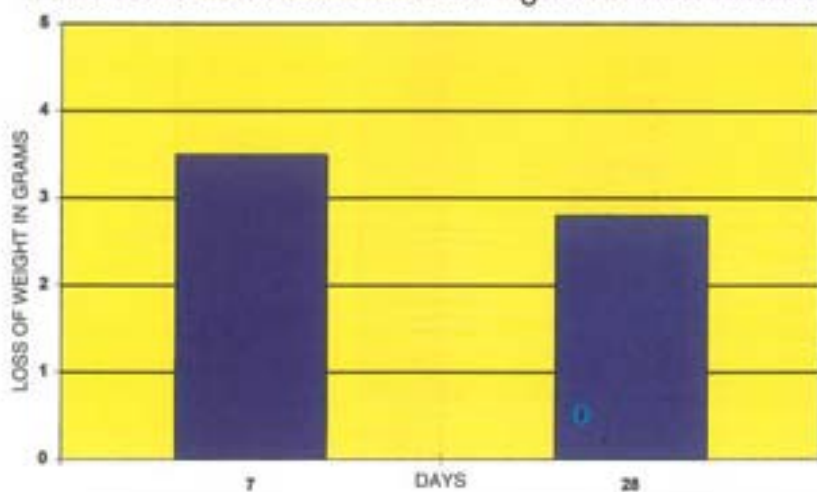
PIANODUR R is ready to use, it must only be mixed with water by means of an electric mixer. After mixing, it becomes an easily workable, self-levelling mixture, applicable in a maximum

thickness of 3 mm per coat. Thanks to its extremely fine granulometry application is possible even to zero, also if maximum mechanical resistance is obtained for thicknesses greater than 1 mm.

For its high mechanical resistance it is suitable for smoothing in environments where intense traffic is foreseen, as for example gymnasiums, hospitals, supermarkets, etc.

In the graphics are reported the mechanical and abrasion resistances of PIANODUR R.

Resistance to abrasion tests according to the TABER method



Source: Mapei's R & D Laboratories

The graph illustrates the resistance to abrasion of PIANODUR R after 7 and 28 days curing of the test samples at a temperature of +23°C and 50% R.H. The test has been carried out using the Taber abrasion metre, subjecting the test samples to a wearing action of particular abrasive grindstones and measuring their loss of weight after they have completed 200 revolutions. We would like to highlight that this test has been extremely severe and if it is carried with traditional cement smoothing we will see their total wear after a low number of revolutions.

Preparation of the support

PIANODUR R can be applied in internal environments on dry supports and where there is no rising damp.

• Cement substrates

These supports must be mechanically resistant and free of cracks.

Loose parts, dust and anything else that can impede adhesion must be carefully removed.

Proceed then to apply by brush a coat of PRIMER G diluted with water in a ratio of 1:3 or LIVIGUM diluted with water in a ratio of 1:5. This last operation is important for the following reasons:

- to fix the residues of dust on the surface of the screed;
 - to seal the porosity of the substrate preventing the absorption of the mixing water of the leveller and encouraging a perfect hydration and anchorage.
- Once the PRIMER is absorbed, it is possible to carry out the application of PIANODUR R.

• Pre-existing flooring of ceramic

or natural stone

In this case it is not necessary to use a primer, the following operations are sufficient:

- verify the perfect anchorage of the pre-existing flooring;
- carry out careful washing with water and caustic soda and successively rinse with clean water.

It would be possible to carry out the smoothing as soon as the support is dry.

• Anhydrite substrates

For smoothing the supports it is necessary to scrupulously follow these operations:

- verify that the residual humidity of the anhydrite is inferior to 0,5%;
- sand the surface of the substrate and remove the dust;
- apply a coat of PRIMER G.

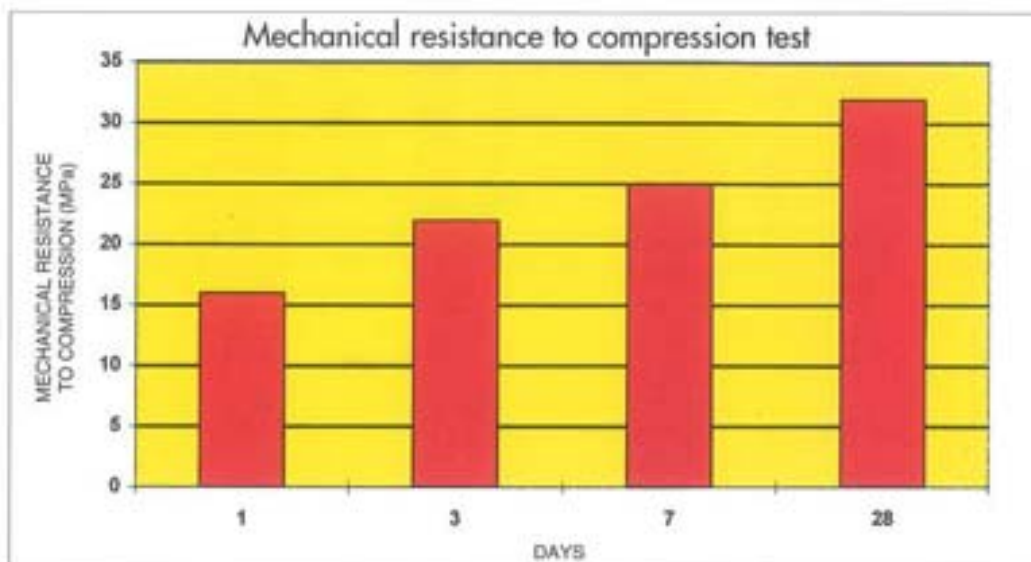
When the PRIMER G is dry, it is possible to carry out the smoothing.

Spreading the mix

It is possible to spread the prepared PIANODUR R mix with

a metal trowel or spreader. Thanks to its elevated self-levelling characteristic, the inevitable imperfections left during application become smooth and level in a short time. The result is a perfectly flat surface, strongly adherent to the support that can be walked on after approximately 3 hours at a temperature of +23°C. The PIANODUR R smoothed surface is suitable for receiving any resilient or textile flooring 12-24 hours after application, depending on the temperature. In the case that a further smoothing coat is necessary, it is possible to apply it after the first coat can be walked on. □

The PIANODUR R technical data sheet is contained in binder number 2, "Resilients and wood line"



The graph illustrates the mechanical resistances to compression of PIANODUR R on prisms with a measurement of 4x4x16 cm, cured at a temperature of +20°C with 95% R.H. It is possible to see the rapid development of mechanical resistances already after a short period of curing and the considerable mechanical resistances that this leveller achieves after 28 days.

Source: Mapei's R & D Laboratories

NIVORAPID

A LEVELLING MORTAR SUITABLE FOR THE RESTORATION AND LEVELLING OF FLOORS, WALLS, STEPS, CORNERS AND VERTICAL SURFACES.

by Francesco Stronati

Leveling of cement substrates or old ceramic floors before overlaying new flooring, repairing corners of columns or steps, refilling holes in floors, walls or ceilings; all these jobs can be easily and rapidly carried out with one product: NIVORAPID, quick setting thixotropic cement levelling mortar, formulated by the Mapei laboratories. NIVORAPID can be considered a universal product; differing from other levelling materials in fact, thanks to its thixotropy, it can easily be applied vertically.

An ultra-fast setting levelling compound

NIVORAPID is a grey powder composed of special cement binders and graded aggregates that, when mixed exclusively with water, becomes an easily workable thixotropic paste, applicable by trowel in thicknesses varying from 2 mm to 2 cm without undergoing appreciable hygrometric shrinkage. Thanks to its short setting time, NIVORAPID allows the laying of ceramic floorings and coverings after only 4-6 hours after its application (depending on the ambient temperature).

NIVORAPID is perfectly suitable for levelling substrates, both for cements and those realized with MAPECEM binder. When having to install floorings of parquet, pvc, linoleum or any other material sensitive to residual humidity in the substrate it is indispensable that, in the act of application of NIVORAPID, it has

PHOTO 1



a residual moisture level such as to render it suitable for the direct laying of these materials. NIVORAPID levelling is able to receive any type of flooring even if subjected to heavy traffic. After the setting of NIVORAPID a support is obtained that is mechanically resistant (52 M/mm² after 28 days curing at +23°C) and extremely resistant to indentation and wearing (Brimnell hardness 85 N/mm² after 28 days curing at +23°C).

Applications

- **Absorbent substrates**
Before applying NIVORAPID on absorbent substrates, it is advisable to apply a coat of PRIMER G, diluted with water in a 1:3 ratio, or LIVIGUM, diluted with water in a 1:5 ratio. This operation is necessary for two reasons: one is to fix any residual dust on the surface of the substrate the other is to block the surface porosity of the screed, so as to stop the absorption of the mix water of the levelling compound, therefore favouring correct hydration. Once the primer is absorbed (after about 1

hour) it is possible to apply NIVORAPID.

- **Pre-existing ceramic surfaces**
No primer is necessary when levelling old ceramic floorings or coverings. Although it is necessary to verify that these supports are perfectly anchored and then to carry out thorough cleaning of greases, wax etc., by using water and caustic soda, followed by adequate rinsing. When completely dry it is possible to apply NIVORAPID.

- **Anhydrite substrates**
Particular attention must be taken when levelling anhydrite substrates. Method to follow in this case is the following:
 - verify that the residual humidity of the substrate is inferior to 0,5 by weight;
 - sandpaper the surface of the anhydrite;
 - apply a coat of PRIMER G. When the PRIMER G is completely dry it will be possible to carry out the levelling.

- **Errors in ratios and elevated thicknesses**
The application of NIVORAPID in two successive layers can become necessary in the case of errors in the ratios or coats of elevated thicknesses. It is then possible to apply the second layer before the first is ready for traffic (about 2 hours after the application of the first layer at a temperature of +23°C) without the necessity of applying any primer. In case the first layer was perfectly hardened, a preventive application of a coat of PRIMER G is necessary, diluted with water

in the ratio of 1:3, or a coat of LIVIGUM, diluted with water in the ratio of 1:5.
It will be possible to carry out the application of the second layer of NIVORAPID as soon as the primer is absorbed.

- **Vertical levelling**
NIVORAPID can also be used for levelling vertical surfaces such as step risers, corners of columns, concrete or plastered walls. NIVORAPID, used on vertical surfaces, provides a finish ready to be painted, only a few hours after its application. To conclude, NIVORAPID levelling compound, is a truly universal product: the only contraindication is its use in the case of humidity and therefore also its use externally. NIVORAPID in fact can only be applied in internal environments where there is no rising damp present. □

PHOTO 2



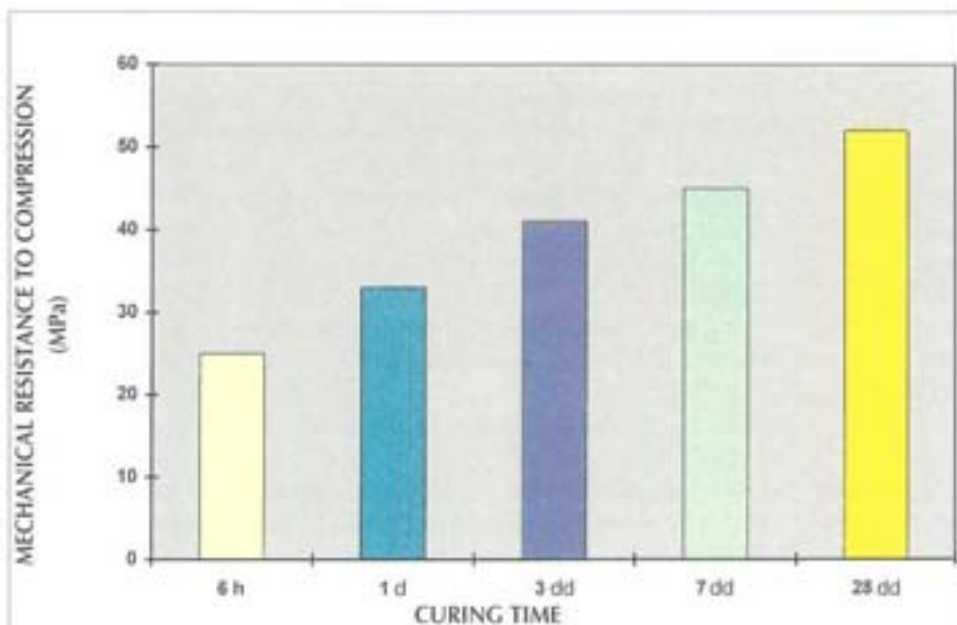
PHOTO 3



Photos 1, 2 and 3
The photos show some of the principle applications of NIVORAPID: repair of the corner of a step of a staircase (photo 1), of a vertical corner (photo 2) and the refilling of holes in flooring (photo 3)



The technical details of NIVORAPID are contained in Mapei binders number 1 "Ceramic line", number 2 "Resilients and wood line" and number 3 "Building line"



Source: Mapei's Research Laboratory

The graph illustrates the mechanical resistance to compression of NIVORAPID measured on prisms with the dimensions of 4x4x16 cm and cured at a temperature of +23°C and relative humidity of 95%. It is possible to see how NIVORAPID develops elevated mechanical resistance to compression already after a few hours from its application making therefore possible the speedy installation of ceramic flooring and its opening to traffic.

CONCRETE IS NOT AFRAID TO TAKE OFF

ETYMOLOGICAL DIGRESSIONS AND MYSTERIOUS ACRONYMS IN THE FUTURE OF CONCRETE.

by Mario Collepardi

The title of this article like nearly all those of this column, can be read in a metaphoric key. But this time, as I will demonstrate later, it can also be read in a more strictly literal sense. Of course we are not dealing with the usual way concrete is treated, sometimes abused or maltreated, in almost all the building sites in Italy. But for sure it represents an evolution of it that people are now concretely thinking about for the projects of the twenty-first century that is almost upon us. It is always a conglomerate with a base of cement and stone elements. But, both for the special additives and for the particular manufacturing process and above all for the extraordinary performances that follow, it becomes such an innovative material that it will certainly require a name that will differentiate it from ordinary concrete. This term, on the other hand, is at the acceptable limit of semantics.

The term "concrete", in fact, besides being very often confused with that of "cement" by the majority of those in the know (but not only by those), has etymological origins that do not have anything to do with the material currently and actually used in the majority of infrastructure and building works. It in fact derives from the Latin *calcistructio*, that literally means "structure in lime" and appears from the first time in XVI century, when in fact the binder was of a lime base and not cement. Personally I would not indulge in linguistic chauvinism (as often

happens with the French) and I would call it more appropriately "concreto" or more simply with the original English term "concrete". The right to mint a name for an object or a subject, in fact, goes to the language whose people have invented them. So nobody in the world (not even in France) is scandalized by the Italian terms used in the musical field ("andante", "allegro", etc.) or in the gastronomic one ("pizza", "spaghetti", etc.) because these terms have been invented in Italy, although they have afterwards fortunately spread all over the world. And so if it is true that "concrete" (in the form in which today it is still substantially used) has been invented in Great Britain in the last century, it would be more appropriate to call it with this term, rather than inventing one in Italian, etymologically wrong and above all a little clumsy.

But, putting aside these semantic digressions and returning to the object of the title, I would like to demonstrate that concrete is about to take off or at least to contribute to the revolution that in XXI century we are about to realise in the air transport sector. I will stick to, in order not to fly myself, two precise documents: the first is an article that appeared in the English magazine *Design* (July 1983) with the title "Towards the concrete aeroplane?"; the second one is the announcement of a stimulating congress (*Building for the 21st Century*) that was held in 1995 in Australia on the mega-structures of building and civil engineering in the XXI century. The English magazine article heralds the possibility of using special cements for some specific parts of future airplanes thanks to the potential mechanical performances (in particular the resistance to fatigue) expected from these special materials known as "MDF cements" from the initials Macro-Defects Free (free from macro-defects). The term "macro-defects" is, as intended by the inventors of this material who have also coined the name (Birchall and collaborators), inclusive of both the pores and the cracks generally found in the usual void free materials - also those only visible with an electronic microscope - that for this reason have extraordinary mechanical performances: in order not to bore the reader and limiting myself to only one performance, I would like to highlight that the resistance to flexion of the materials with MDF cements can reach 250

FIG. 1

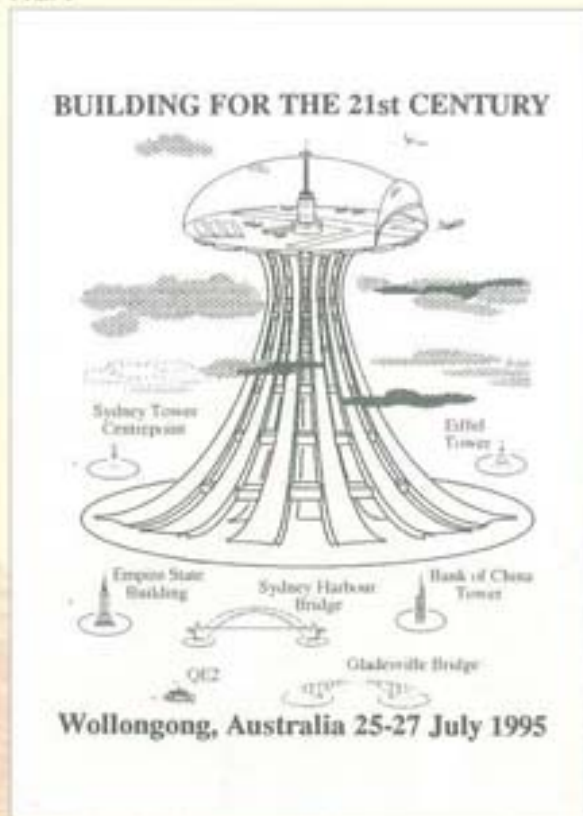


Fig. 1
The brochure
front cover for
the congress
"Building for
the 21st
Century"

In the
background a
drawing by
Leonardo da
Vinci from the
"Studi per il
volo umano
strumentale -
Codice
Atlantico"

N/mm² against the N/mm² values generally found in usual cement conglomerates. Obviously these are materials that because of their composition (in particular for the presence of large quantities of special polymers, up to 10%, in respect to the cement) and the method of their manufacture (substantially lamination or extrusion) are intended only for the production of particular products in sectors differing from the traditional ones of building and infrastructure civil engineering. It is necessary, moreover, to plan an intensive research programme to refine and simplify the production process (much more sophisticated than that used for traditional concrete pours), and to resolve some durability problems in relation to external environments. But the die is cast, sooner or later in the XXI century we will arrive at the point of flying also with cement.

The second document that I have mentioned above is perhaps closer to the interest of the readers of this magazine because it regards the planning and the realisation of mega-buildings and mega-infrastructure. One of which, schematically illustrated with a design that is reproduced above, appeared on the front of the brochure that announces the congress on this topic. As you can see, it is an airport runway supported by a structure ten times higher than New York's Empire State Building or twenty times Paris's Eiffel Tower.

The urban development of the XXI century will bring the growth of numerous megalopolis (those with more than 10 million inhabitants), for which the geographical emargination of structures such as airports will bring severe loss of time in urban transfers in respect to actual flight times.

Therefore the need to locate the airport centrally will grow in relation to the urban development of the mega-city, in order to literally lower the travellers with the help of express lifts from the elevated runway to the mega-city. Frankly I can not tell you if the specific example of the airport mentioned above is only science-fiction or whether it is also futuristic but reasonable projections from planners that have met at this congress in

Australia. The fact is that megalopolis similar to this one are being actually considered.

One of the problems to face is that of finding proper materials for this type of work. And certainly one can say that it will not be the actual concrete that is currently used today. Therefore, maybe, those who - amongst industries and universities - have already invested in research on new cement materials, have not lost time and money.

I would like to mention two material types that stand beside the above mentioned MDF cements: DSP materials (from the initials of "Densified with Small Particles") and RPC materials from the initials of "Reactive Powder Concrete". Both are based on cement as well as, extremely fine aggregate elements, new plasticising polymers and inorganic materials in the form of fibres or mineral additives. The manufacturing processes are very different from those used for MDF cements and are based on pressure stamping (similar to that used in mechanical industries) or on the soft casting technique very similar to the traditional casting of concrete in shuttering: this latter technique (both for higher manufacturing simplicity, and for the possibility of obtaining complicated geometric forms of large dimensions) is obviously more suitable than the others for the manufacture of products intended for the mega-infrastructure similar to that of the elevated airport.

Already today, just to mention some performance data, it is possible in less than 24-28 hours to produce in a laboratory prefabricated elements with a mechanical resistance to compression beyond 150/200 N/mm².

Already performances have been reported, during international congresses, that can reach a mechanical resistance to compression of up to 800 N/mm². All this together with the characteristics of workability and tenacity absolutely unthinkable in traditional concretes. Of course these are materials decidedly out of place with regard to current applications in building or civil engineering, but they are ready to take off for applications in the mega-infrastructure of the by now close XXI century. □

The article is gratefully reproduced from "Industria italiana del cemento" (issue n.693, pages 727-729, November 1994).

FLOOR JOINTS

THE EXPANSION JOINT, AN INDISPENSABLE STRUCTURAL ELEMENT, IS THE MOST DELICATE POINT OF ALL FLOORS AND MUST BE CARRIED OUT AS A WORK OF ART.

by Paolo Giglio



MAPEBAND



MAPELASTIC



MAPEFOAM

The expansion joint has always been considered an obstacle, the weak point where problems concentrate often causing irreversible situations for the proper maintenance of an installation.

It is no secret in fact, that the majority of problems, in the installation of floorings and coverings of ceramic tiles both internally and externally, are attributed to the fated expansion joint.

A joint calculated dimensionally in an incorrect way, a joint not complied with during installation, a joint not sealed, an unsuitable joint that is not able to absorb the dilatometric tensions and movements of the support or of the installed material: these are some of the realities that we daily have to face.

It is without doubt the most delicate point in the whole system.

The dimensional calculation, that is made at the design level, must be combined with a proper technical solution that provides for the maximum optimization of the technical, functional and aesthetic aspect of the joint.

For example. Let us hypothesize that a problem must be resolved with an expansion joint for which is required a total impermeability of the support destined to receive directly a flooring of ceramic tiles, marble, terra-cotta, etc. Our explanation is assisted by the drawing on the next page.

Install the cement screed, and after a proper curing period, proceed with the successive operational phases.

The expansion joints in the screed must have a depth of approximately 1/3 of its thickness; whenever the substrate is reinforced with welded steel mesh, care must be taken not to cut into the mesh (point 1 in the drawing).

Place, in proximity of the expansion joint, MAPEBAND, a rubberized fabric tape, suitable as a flexible and waterproofing covering for connection and expansion joints under coverings of ceramic materials. MAPEBAND must be placed at point 2; the hydraulic seal system is completed by the connection with MAPELASTIC.

The MAPELASTIC (two-component flexible cement mortar) must cover the lateral reinforcing (netting) present in the MAPEBAND; this operation (point 3) will give continuity to the impermeability throughout all the surfaces involved. Approximately 24-48 hours after spreading the MAPELASTIC the laying of the flooring can proceed with the adhesive system GRANIRAPID or KERACRETE mixed with KERACRETE POWDER

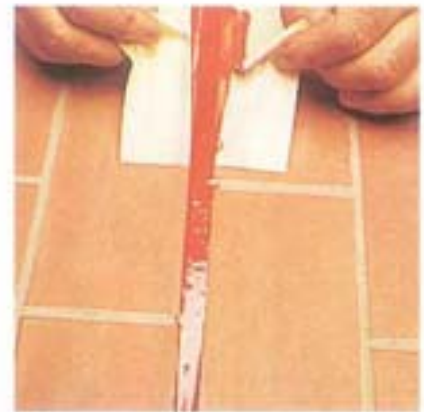
Residential district (Perugia-Italy) - porcelain tile installation, joints filled with MAPESIL AC



Changi Airport
Singapore - porcelain
tile installation, joints
filled with
MAPEFLEX PU21



MAPESIL AC

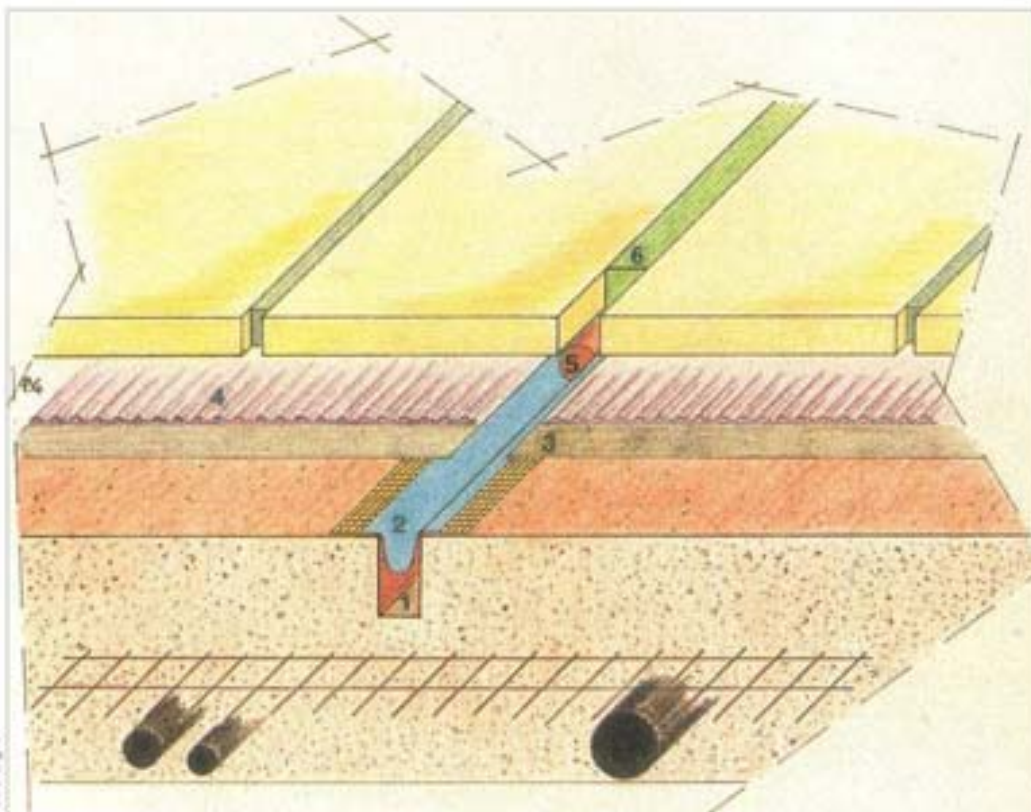


MAPEFLEX PU21

(point 4). MAPEFOAM, expanded closed cell polyethylene foam cord, is then inserted into the MAPEBAND notch (point 5). MAPEFOAM, available in various diameters, has the purpose of correcting the dimensional section of the joints that must be successively filled with a sealer of proper flexibility. The last operation is to carry out the final

sealing of the joint, using MAPESIL AC or MAPEFLEX PU21 (point 6), depending on what is required. In this way an effective and interesting solution is found for our everyday problems. □

The products mentioned in this article are contained in Mapei binder number 1 "Ceramic line"



Example of an expansion joint in the flooring system:
(1) joint
(2) MAPEBAND
(3) MAPELASTIC
(4) adhesive
(5) MAPEFOAM
(6) flexible sealer

NATURAL OR SYNTHETIC?

AT THE S. SIRO STADIUM IN MILAN THE NATURAL GRASS CARPET LIVES ALONGSIDE A NEW SURFACE OF SYNTHETIC GRASS.

by *Natasha Carandino*



PHOTO 1



PHOTO 2



PHOTO 3



Photo 1
The state of deterioration of the pitch before work was started

Photo 2
The sods of natural grass are removed

Photo 3
ADESILEX G19 in a green colour, produced to order

The Olympic Stadium of Rome, the Athletic Stadium of Madrid, the National Stadium of Singapore, the Stadium of Monaco, the Olympic Stadium of Montjuic in Barcelona.....

ADESILEX G19, a two-component polyurethane adhesive produced by Mapei, has already given ample proof of its toughness and elasticity in the bonding of sporting surfaces.

This product, one of the first born in the house of Mapei, has recently been used for the installation of the synthetic grass sheets that surround the football pitch of the Meazza Stadium in Milan (Italy).

The modifications of new roofing to the stands around the Milan stadium brought about by the Italia '90 World Cup, have in fact caused a loss of sunlight to the playing surface, impeding the photosynthesis necessary for the fixing of the roots of the grass mantle to the ground. Consequently, the sods of earth have lifted and the pitch has started to rapidly deteriorate. The councilor responsible for sport at that time (defined later as councilor for "Gardening") tried different stratagems to remedy the problem provoked by the new, although necessary, covering solution of the

playing surface, but, in the course of time, all the techniques used have failed. The use of a synthetic grass carpet covering the playing field would have probably solved the problem for good, both from a technical and economical point of view, but specific Italian regulations, restated again in the last updated edition of "Le Carte Federali" (1st July 1994), that we reproduce on the next page, prescribes for playing fields the use of surfaces strictly of natural grass. Therefore, constrained by the regulations from C.O.N.I., the Council of Milan has now tried the umpteenth remedy employing full time one of the leading experts in gardening, the Englishman Steve Taylor, who has been charged with taking care of the natural grass carpet in order to make it suitable for the matches that this year include, together with the League matches, the most important football matches on a European level, the Uefa Cup and the Champions Cup. The work of stabilizing the surface of the pitch has been carried out at the same time both internally and externally of the playing surface: while bare foot and bare-chested Mr. Taylor was sweating up and down the pitch in order to apply

PHOTO 4



PHOTO 5



new solutions of grassing, the installation team, lead by the surveyor Nobili, applied a resilient covering, with the same naturalness that they would have had on a normal building site.

This expedient of resolving a small problem around an Italian football pitch is instead very often used abroad with excellent results and, certainly, with less maintenance problems and therefore costs, in respect to natural grass mantels. On a substrate of stabilized crushed stone, necessary to allow drainage, synthetic grass sheets were laid on the edging strips of the pitch.

The necessity of guaranteeing some parameters of response of the football on the synthetic grass mantel, such as bounce, rolling and deviation in respect to the initial direction, has made necessary particular accuracy in the laying of the "woven-non-woven" sheets.

The use of Mapei's ADESILEX G19, a two component polyurethane adhesive for bonding rubber and PVC flooring, outdoor carpets, on

PHOTO 6



asphalt cement etc., in the linking joints between one sheet and the other has guaranteed the maximum yield in terms of tenacity of adhesion satisfying therefore the requirement of flatness and stability of the synthetic surface. □



"Le Carte Federali"

Title IV

"The competitive activity and the competitions"

Art. 44 - par. 6

..... The playing fields, strictly in natural grass, must have the dimensions of m 105x68. An adjustment of the size of the short side up to a minimum width of m 65 is allowed only in cases of proven technical problems of the ground. The surface of the playing fields must have an inclination of not more than 0,5% in the direction of the axis, for the drainage of surface water.....

Photo 4

A phase of the laying of ADESILEX G19 on the lateral strips of the pitch

Photo 5

An installer joins the sheets of synthetic grass on the mantel of ADESILEX G19

Photos 6, 7 and 8

End of the works: which one is synthetic?

The pitch ready to be played on: Mapei has scored a goal!

The technical sheet of ADESILEX G19 is contained in the Mapei binder n.2 "Resilients and wood line".



PHOTO 7

PHOTO 8





The International Cycling Union has imposed on the professional teams a maximum membership of 25 racers per season. Mapei Gb, in respect to '96, has 7 athletes less. On the other hand the percentage of successes has increased. Jan Svorada, 29 year old from the Czech Republic, has been the "top scorer" of the beginning of the season. This year he has started like a shot, winning 3 stages of the Etoile des Besseges, in France. The other arrow of the team, the Belgian Tom Steels, has started the series of successes in Spain, at the Magalief Trophy. Also Johan Museeuw, road racers world champion, is an athlete who honours the shirt he wears. For this reason he has started to win in February. He has won 3 stages at the Ruta del Sol in Andalusia.

Fabrizio Fabbri is... the Sandokan of Mapei Gb. The Tuscany born manager has in fact directed six Mapei Gb "tiger cubs" at the Langkawi Tour, in practice a Tour in stages of Malaysia. In the very hot climate of Malaysia the best tiger cub has been Andrea Tafi, with 2 stage victories, Bandar Melaka and Kota Bahru.

At the Paris-Nice Steels has hit the center with four winning sprints. He has raised the flowers in Bourges, Mont Lucon, Venissieux and on the beautiful "Promenade des Anglais" in Nice. The new team member Gianluca Pianegonda has had a great start wearing

for a few days the leaders shirt of the Tirreno-Adriatico race. At the end he arrived second, only 9" from Petito. The witches have created a lot of difficulties for Pavel Tonkov. The leading Mapei Gb man for the great stage races, while completing a training session on the Tyrrhenian coast, he has fallen, breaking the metacarpus. Pavel had to modify his training, missing some races. Tafi, Peeters, Bomans and Spruch have instead fallen on the Cipressa hill, during the Milano-Sanremo, the opening race of the World Cup. Also Museeuw has finished up on the asphalt, shoulder charged by Jalabert, on the finishing straight of the "Sanremo". Svorada has won with a princely sprint



Pavel Tonkov

Johan Museeuw





Oscar Camenzind, Frank Vandenbroucke, Daniele Nardello



Oscar Camenzind and Frank Vandenbroucke

the Olbia stage of the Giro di Sardegna. Pianegonda, who, having regularly practiced cycle-cross in the young categories, is really at ease on uneven roads, won the Freccia del Brabante. The Three days of La Panne, in Belgium, has resulted in a triumph for Mapei Gb: 1st Museeuw, 2nd Bomans. Misfortune has persisted once again with Tonkov during the Tour of the Basque Country, in Spain. He fell on the first stage, getting up with a micro-fracture to the scaphoid. He carried on anyway. At the Tour of the Basque Country, in Spain, another new acquisition, Gabriele Missaglia, has obtained his first professional victory. Missaglia has won the Legazpi stage. Stefano Zanini has instead won the Vitoria and Mondragon stages. Naturally the team continues to dominate the international classifications. Luck however, above all on important occasions, has been missing a little. It has happened for instance at the Tour of Flanders, the race of the terrible walls. Franco Ballerini had to be content with third place. Also Museeuw, at the Paris-Roubaix, has arrived third. Johan twice had punctures at crucial stages. The punctures, one of which happened when Museeuw was in flight together with Tchmil and Moncassin, have prevented the infernal pave' classic race becoming, for the third consecutive year, a "Paris-Mapei Gb-Roubaix". Johan has been preceded by the emerging Guesdon and Planckaert, winning precious points for the World Cup, a challenge dominated by him in '95 and '96.

At the Settimana Bergamasca the thunderbolt Jan Svorada has won three stages. During the competition valid for the Gran Premio Colnago the quick silver of Giuseppe Di Grande has exploded. The young Sicilian has won two difficult stages. In the Amstel Gold Race, Dutch race for the World Cup, Andrea Tafi has arrived second; in the final the Dane Riis has made himself unreachable. Thanks to the precious collaboration of Svorada the tough Davide Bramati

has celebrated the success at Dobbiaco, the penultimate day of the Giro del Trentino.

Mapei Gb has landed in Normandy with great ambitions: Wilfried Peeters has won a stage, Museeuw has triumphed in the time trial and in the final classification at the Four Days of Dunkerque. The team has been great also at the Tour de Romandie, the stage race in French speaking Switzerland. Tonkov has triumphed in the most difficult stage, at Veissonaz, and the general classification. Di Grande has won a stage. Yoshiyuki Abe, has achieved a triumph in his native Japan. Daniele Nardello has won the stage race Tour of Austria. Mapei Gb has been the master of the race: in the general classification Daniele has preceded by 2'40" Vandenbroucke and by 3'40" Camenzind. A nice hat trick. The team has obtained 7 stage successes subdivided as follows: 3 Vandenbroucke, 2 Nardello, 2 Camenzind. On the second stage, from Graz to Grobming, Vandenbroucke has preceded Camenzind and Nardello. Even if with separate finishes, the team has obtained a hat trick also in the 8th stage: 1st Vandenbroucke, 2nd Camenzind, 3rd Fois. Camenzind has triumphed in the points classification and in the one for climbers.

Pavel Tonkov has concluded the Giro d'Italia in second place, but Mapei Gb must not blush. It has been a great protagonist in the race for the pink shirt won by the climber Ivan Gotti, winning 5 stage successes.

The Russian, who has won the 1996 Giro, in the first part has overcome everybody from the athletic point of view. On the third stage, during the hill time trial of the Repubblica di San Marino, Pavel has won with 21" over his



Jan Svorada

countryman Berzin, putting on the pink shirt. On the fifth day, in the stage with the finish on the long climb of Terminillo, Tonkov has won again with a domineering progression. Then Missaglia and Di Grande have thought to give the team the stage successes respectively at Lido di Camaiore and Varazze. For Mapei Gb life has become more complicated in the Alps. Exploiting the surprise factor, Gotti has left Tonkov behind on the Cervinia stage, in Val d'Aosta.

In the time trial of Cavalese, Tonkov has gnawed 14" in the classification from Gotti. The next stage at Falzes, between the Alto Adige mountains, has been fatal for Pavel. He has fallen on a down hill, in the rain. Despite his ardour, Pavel has arrived at the finish 55" behind Gotti. The pair Gotti-Tonkov have arrived at a play-off, that is the big Dolomite stage with the terrible Passo del Mortirolo, divided by 1'32" in the general classification.

On Mortirolo Gotti has demonstrated that he deserved the pink shirt. Tonkov has anyway won the stage, that finished at Edolo, after the fast descent: a partial success to be framed.



Gabriele Missaglia

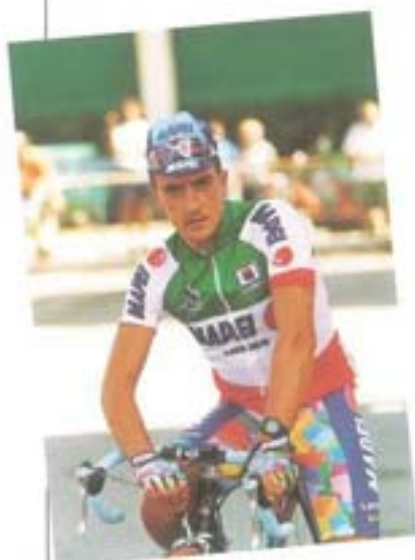
MAPEI GB: THE VICTORIES

- 6/2 SVORADA G.P. de Sète / Etoile de Bessèges (FRA)
- 7/2 SVORADA St. Florent-Les Fumades / Etoile de Bessèges (FRA)
- 9/2 SVORADA Molière sur Côte-Bessèges / Et. De Bessèges (FRA)
- 13/2 STEELS Trophée Magalluf (ESP)
- 17/2 MUSEEUW La Rinconada-Puente Genil / Ruta del Sol (ESP)
- 19/2 MUSEEUW Cabra-Málaga / Ruta del Sol (ESP)
- 20/2 MUSEEUW Torrox Costa-Granada / Ruta del Sol (ESP)
- 21/2 TAFI Batu Pahat-Bandar Melaka / Tour de Langkawi (MAL)
- 27/2 TAFI Kuala Terengganu-Kota Bharu / T. d. Langkawi (MAL)
- 28/2 BUGNO Jelli-Jerik / Tour de Langkawi (MAL)
- 2/3 MUSEEUW Kuurne-Bruxelles-Kuurne (BEL)
- 10/3 STEELS Vendôme-Bourges / Paris-Nice (FRA)
- 11/3 STEELS Bourges-Monlfuron / Paris-Nice (FRA)
- 13/3 STEELS Courmayeur-Auvergne-Venissieux / Paris-Nice (FRA)
- 16/3 TEELS Nice-Nice / Paris-Nice (FRA)
- 29/3 SVORADA Alghero-Olbia / Giro di Sardegna (ITA)
- 30/3 PIANEGONDA Fleche Brabantonne (BEL)
- 3/4 MUSEEUW Trois Jours de La Panne (BEL)
- 7/4 MISSAGLIA Legazpi-Legazpi / Vuelta Pais Vasco (ESP)
- 9/4 ZANINI Viana-Vitoria / Vuelta Pais Vasco (ESP)
- 11/4 ZANINI Sopuerta-Mondragon / Vuelta Pais Vasco (ESP)
- 14/4 SVORADA Pieve-Livorno d'Oglio / Set. Bergamasca (ITA)
- 16/4 SVORADA Zanica-Zanica / Settimana Bergamasca (ITA)
- 17/4 DI GRANDE Zogno-Zogno / Settimana Bergamasca (ITA)
- 19/4 DI GRANDE Flero-Flero / Settimana Bergamasca (ITA)
- 20/4 SVORADA Bergamo-Bergamo / Settimana Bergamasca (ITA)
- 26/4 ABE Japan All Professional Race - Campionato Giapponese (JAP)
- 30/4 BRAMATI Moena-Dobbiaco / Giro del Trentino (ITA)
- 6/5 PEETERS Dunkerque-Boulogne s. M. / Q.J. de Dunkerque (FRA)
- 7/5 DI GRANDE Kriegstetten-Le Lode / Tour de Romandie (SUI)
- 8/5 MUSEEUW St. Quentin (crono) / Q. Jours de Dunkerque (FRA)
- 10/5 TONKOV Monthey-Veyrieres / Tour de Romandie (SUI)
- 11/5 MUSEEUW Classifica finale Quatre Jours de Dunkerque (FRA)
- 11/5 TONKOV Classifica finale Tour de Romandie (SUI)
- 19/5 TONKOV Santarcangelo-San Marino / Giro d'Italia (ITA)
- 21/5 TONKOV Arezzo-Terminillo / Giro d'Italia (ITA)
- 24/5 VANDENBROUCKE G.P. Kain (GER)
- 27/5 MÜLLER cronoprol. Markt Oberdorf / Bayern Rundfahrt (GER)
- 28/5 MISSAGLIA Lido di Camaiore / Giro d'Italia (ITA)
- 29/5 DI GRANDE La Spezia-Varazze / Giro d'Italia (ITA)
- 29/5 CAMEZIND cronoprol. Wien / Österreich Rundfahrt (AUT)
- 30/5 NARDELLO Eisenstadt-Graz / Österreich Rundfahrt (AUT)
- 31/5 VANDENBROUCKE Graz-Großgörs / Öster. Rund. (AUT)
- 2/6 VANDENBROUCKE Trumer S. - Bad Hofgastein / Öster. Rund. (AUT)
- 3/6 CAMEZIND Bad Hofgastein-Lienz / Österreich Rundf. (AUT)
- 5/6 NARDELLO St. Johann-Villach / Österreich Rundfahrt (AUT)
- 6/6 VANDENBROUCKE Fooker See-Fooker S. / Ost. Rund. (AUT)
- 7/6 TONKOV Mali-Edolo / Giro d'Italia (ITA)

- 7/6 NARDELLO Classifica finale Österreich Rundfahrt (AUT)
- 13/6 STEELS Dudelange-Bertrange / Tour de Luxembourg (LUX)
- 14/6 VANDENBROUCKE crono Bettembourg / Tour de Luxembourg (LUX)
- 15/6 TONKOV Giro dell'Appennino (ITA)
- 15/6 VANDENBROUCKE Classifica finale Tour de Luxembourg (LUX)
- 17/6 CAMEZIND cronoprolago Ramanshorn / T. de Suisse (SUI)
- 19/6 SVORADA Vila Seca-La Pineda / Volta a Catalunya (ESP)
- 20/6 SVORADA Port Aventura-Lleida / Volta a Catalunya (ESP)
- 22/6 SVORADA St. Joan d'Espí-Barcelona / Volta a Catalun. (ESP)
- 23/6 STEELS Locarno-Zug / Tour de Suisse (SUI)
- 25/6 CAMEZIND Wetzikon-Davos / Tour de Suisse (SUI)
- 29/6 FAREIN G.P. Lorciano - Campionato Italiano (ITA)
- 29/6 STEELS Campionato del Belgio (BEL)
- 29/6 CAMEZIND Campionato Svizzero (SUI)
- 3/7 BRAMATI Memorial Casartelli (cronocoppie) (ITA)
- 28/7 VANDENBROUCKE Criterium di Aoste (BEL)
- 30/7 SVORADA Pinhal Novo-Evora / Volta a Portugal (POR)
- 30/7 MUSEEUW Criterium di Peer (BEL)
- 2/8 NARDELLO Criterium d'Abruzzo (ITA)
- 2/8 JASKULA Castelo de Vide-Portalegre (crono) / Volta a Portugal (POR)
- 2/8 PEETERS Criterium di Dielsen (BEL)
- 3/8 VANDENBROUCKE Trofeo Matteotti (ITA)
- 3/8 STEELS Fleron-Farmeries / Tour des Régions Wallonnes (BEL)
- 4/8 STEELS Estaimbourg-Chapelle / Tour des Régions Wallonnes (BEL)
- 7/8 MUSEEUW Circuito di Kortrijk (BEL)
- 8/8 JASKULA Mirandela-Mondim de Basto / Volta a Portugal (POR)
- 10/8 JASKULA Classifica finale Volta a Portugal (POR)
- 11/8 SVORADA Ferrol-Ferrol / Vuelta a Galicia (ESP)
- 13/8 SVORADA Monforte-Ourense / Vuelta a Galicia (ESP)
- 17/8 TAFI Rochester International Classic (GBR)
- 22/8 STEELS Circuito di Almelo (NED)
- 26/8 TONKOV Biella-Orapa / Trofeo dello Scalatore (ITA)
- 28/8 TONKOV Classifica finale Trofeo dello Scalatore (ITA)
- 2/9 STEELS G.P. Schaaf Sels (BEL)
- 14/9 TAFI G.P. Fourmies (FRA)
- 14/9 MUSEEUW cronocoppie G.P. Karlsruhe (GER)
- 14/9 CAMEZIND cronocoppie G.P. Karlsruhe (GER)
- 16/9 SVORADA Almendralejo-Plasencia / Vuelta a Espana (ESP)
- 19/9 TONKOV Panferrada-Valgrande Pajares / Vuelta a Espana (ESP)
- 21/9 TONKOV Oviedo-Lagos de Covadonga / Vuelta a Espana (ESP)
- 21/9 MUSEEUW Circuito di Luxembourg (LUX)
- 22/9 SVORADA Cangas de Onís-Santander / Vuelta a Espana (ESP)
- 23/9 SVORADA Santander-Burgos / Vuelta a Espana (ESP)
- 25/9 TAFI Coppa Sabatini (ITA)
- 28/9 CAMEZIND classifica finale G.P. Wilhelm Tell (SUI)
- 28/9 ZANINI Milano-Vignola (ITA)
- 26/10 ABE Japan Cup (JAP)

Season 1997 - from 6.2.97 to 26.10.97: 95 victories

FOUR NEW JERSEYS IN MAPEI GB'S WARDROBE



Above: Gianni Faresin

Centre: the podium of the Japanese championship. The athlete in the middle is Abe, winner of the title.

Right: in the photo, from the left, Camenzind who wears the Swiss champions jersey, Muscatelli with the world champion jersey, and Steels, with that of the Belgium champion.

Below: the podium of the Italian championship. From the left: Casagrande, in second place, Faresin, the winner, and Foais in third place.



There is a special wardrobe at the headquarters of Mapei Gb. It is reserved for the National Champion jerseys. This year, the chequered shorts team won the national championship in four different countries: Belgium, Japan, Italy and Switzerland. Never before had a professional team achieved a "poker" in one year. Yoshiyuki Abe, the team's samurai, won the All Japan Professional and the rising sun championship with it. Gianni Faresin became Italian Champion in Tuscany, winning over Francesco Casagrande. Camenzind won the red-crossed jersey near Zurich, where he reached the finish line alone, with two minutes of advantage. Steel is the new Belgian Champion. He won his title in Alsemberg.



MAPEI GB, YOUTH POWER AND RECORD WINS

After his good performance at the Giro d'Italia, Tonkov displayed his skills in Liguria. The powerful long-distance, climber cyclist won the difficult Giro dell'Appennino. Pavel left everybody behind when the road started climbing towards Passo della Bocchetta. Nardello, who came in a brilliant second, completed the Mapei Gb triumph. Frank Vandenbroucke showed all of his power at the Tour of Luxembourg. In the Grand Duchy race, Vandenbroucke won the timed race and the final placing. Steels also won one stage. Sprinter Svorada won three stages of the Tour of Catalunya, Spain.

Oscar Camenzind came second at the Tour of Switzerland, won by France's Agnolotto. The Swiss from Steinen started earnestly in the top race in his own country, and won the prologue. Oscar lost his leadership on day three: he was not timely enough in reacting to what actually showed to be, thanks to Agnolotto's determination, a "fake sprint". Camenzind displayed a good reaction in the following stages. He actually won at Avos. But that was not enough. In the final placing, Agnolotto had an advantage of 2'4" over Oscar.

The podium of the "Giro dell'Appennino" with Tonkov, the winner, and Nardello, in second place.

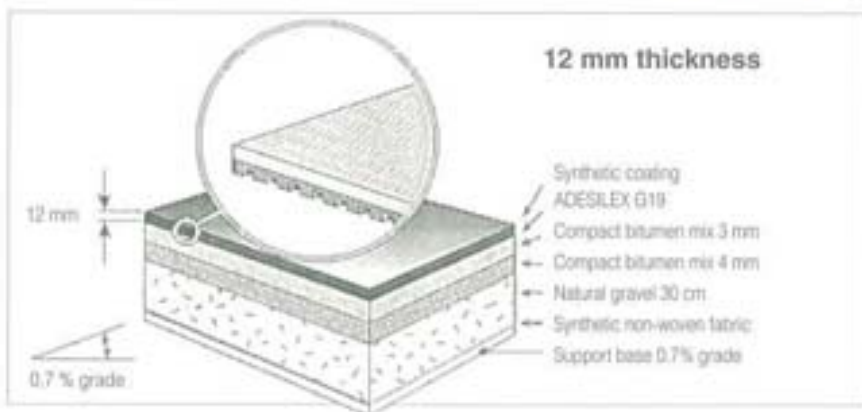




Top athletics meeting world-wide occur on tracks laid with Mapei products, from the Montreal stadium to those in Rome, Munich, Barcelona, to the Olympic Stadium in Atlanta

UNDER AND...

...AR...



where the Olympic Games athletics events - and the opening and closing ceremonies - were held on July 1996. Actually, state-of-the-art tests show that the adhesive material not only performs its natural function, i.e. attaching the top layer to the base, but that it also serves as a

cushion that emphasises the track's elasticity and therefore improves the track's performance. For instance, the Atlanta track, manufactured by Mondo, is made by 80% synthetic rubber and 20% natural rubber. It comprises two overlapped layers,

6 mm thick each: the harder surface layer highlights the athletes' power, thus allowing for a better energy spring. The layer beneath is less dense and is slightly softer, so as to ease the muscles fatigue by decreasing vibrations at the moment of push. This layer, although just a few millimetres thick, makes the track stronger; it is no longer poured, but glued by Mapei directly on the ground by means of ADESILEX G19, a two-component polyurethane adhesive. Thanks to these products, great athletes were able to improve themselves and the world records.

GROUND RECORDS



A GREAT CHAMPION IN MILAN'S ARENA

Alfredo Rizzo was the flagship of Italian middle-distance races and a great champion of Milan's Arena. Thirty-seven times an Italian National Team member, participated at the Olympic Games in Rome, two European Championships, seven wins at the Italian Championships of the 1,500 and 3,000 m steeple, fourteen national records. Today, he devotes his unspilt enthusiasm to training the young athletes of Atletica Riccardi.



Several times, Mapei products are to be found around the athletics tracks: this is the case of Milan's Arena. The finals of the IAAF Grand Prix, the most important athletics event after the Olympic Games, and the closing event of the world championship, had been scheduled for September 7th 1996 in Milan's Arena. For many years, the building had suffered from major decay and needed revamping, so as to enhance its architecture and to make it suitable to the contemporary organisational and safety needs required for sport events.

To bring the Arena back to past glory and lift it up to a good standard, first of all railings and safety exits were upgraded; the "Pulvinare" or Royal Gallery, area was rehabilitated, by reconstructing the roof and restoring the indoor frescos; the stone railings were strengthened and the seating area roofing was rebuilt. Later, the facilities were renovated, especially the women's changing rooms and the public restrooms. Today, the changing rooms are beautiful, fully functional and available for any event. The consolidation of the structure was completed by the renovation of stone railings, located on the top of the flight of steps leading to the monument, by the removal and replacement of flagpoles and by further maintenance on the "Torre Trionfale". Finally, the athletics

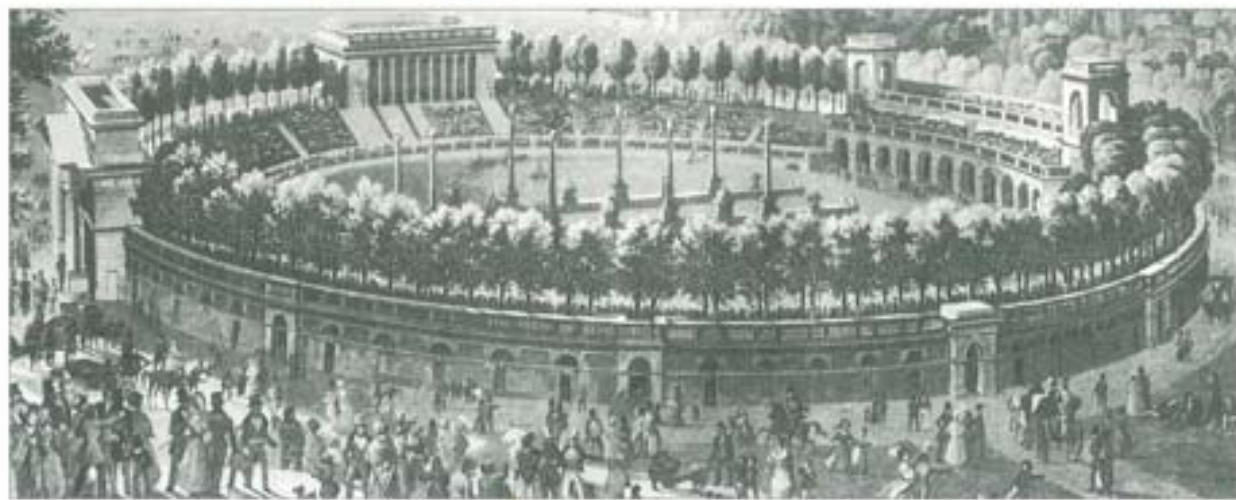


track was totally rebuilt, using the most modern materials, as those supplied by Mondo for the Atlanta track as well. Mapei, with its products, also played an important role in reconstructing the Arena facilities in a short lapse of time. After several inspections, which were made together with the Municipality's engineers and the site supervisors, some works were decided in order to fix, water-proof and seal the tiers of seats. In particular, MAPEGROUT HI-FLOW was employed, a fibre-reinforced controlled-shrink mortar, to consolidate the vault at the north entrance, while MAPEGROUT FAST-SET was used in the renovation of the entrance arch and of the outer coatings. The building's bars, tie rods and reinforcing anchors were anchored by

means of MAPEFILL, a fluid expansion mortar for anchorage devices; as far as the athletics track is concerned, Mapei supplied MAPESIL LM, a silicone sealant, for joints between concrete kerbs all around the track. Other workshave been performed, such as sealing the tiers of the seats: MAPEFOAM was used here, for sizing the joints and to serve as a substrate to lay the MAPESIL LM sealant, which filled in the joints. □

HISTORICAL BACKGROUND

Milan's Arena, by Architect Luigi Canonica, was built in the early 19th Century and was one of the major Napoleonic works designed to reorganise the city's urban planning. Within the project of the city works of the time, and in particular as a part of the redesign of Castle Square and its surroundings, a large amphitheatre was planned, which could host 30,000 people, for horse races, military parades, civil ceremonies and the "naumachias" (i.e. ship battles). The structure of the Arena is an elliptical amphitheatre, with tiers of seats surrounding the inner field, which has a long axis of 238 metres and a short axis of 116 metres. On either edge of the larger diameter are the Triumphal Entrance and the prison building; on the shorter side, the "Pulvinare", or Royal Gallery, and the "libitinaria" doorway. Another doorway is located in front of the prison. Beside these three larger doorways, there are eight minor doors. All around the field, the "Euripo" used to flow, a canal bringing in water for the naumachias. Inside the Pulvinare, there is a grand Corinthian gallery, with eight one-piece pink granite columns; outside, the Arena is a two-storey building, with five openings protruding outwards and a five-arch colonnade supported by pillars. The building was finished and inaugurated in 1807, but the Pulvinare and the Triumphal Door were only completed in 1813; four columns of the Corinthian gallery were brought here from St. Philip's monastery. The Arena was built using the materials coming from the demolition of the Spanish and Austrian ramparts surrounding the Castle.



THE CHURCH OF THE YEAR 2000

MAPEI PRODUCTS CONTRIBUTE TO THE CONSTRUCTION OF THE CHURCH SYMBOL OF THE JUBILEE FOR THE YEAR TWO THOUSAND.

The international competition by invitation for the Church for the year 2000, announced by the "Opera Romana per la Preservazione della Fede", has pronounced as the winner the project of Richard Meier, one of the most important contemporary architects, original heir of the modern tradition. The competition was anyway amongst leading architects given that the other 5 competing projects belonged to Tadao Ando, Günther Behnisch, Santiago Calatrava, Peter Eisenman and Frank O'Gehry. The work dedicated to "Dio Padre di Misericordia" in memory of the last encyclical of Pope John Paul II, will become the symbol of the Jubilee for the year 2000 and will rise in Rome in the peripheral zone called Tor Tre Teste. During a congress held 25th February last in Milan, organised by the University of Milan, in collaboration with Gruppo Italcementi, Pilkington and Mapei, the architect Richard Meier himself has explained like this the philosophy of his project: "The scope was to bring back dignity to an isolated and degraded area, trying to link ideally this peripheral zone to the urban fabric of the city of Rome. There the local community and its context will gather in an universal reaffirmation of the faith and of the spirit". As far as the architectural structure is concerned, this church has been planned with two distinct architectural bodies: the sacred building occupies the southern part and the parish center is placed in the northern

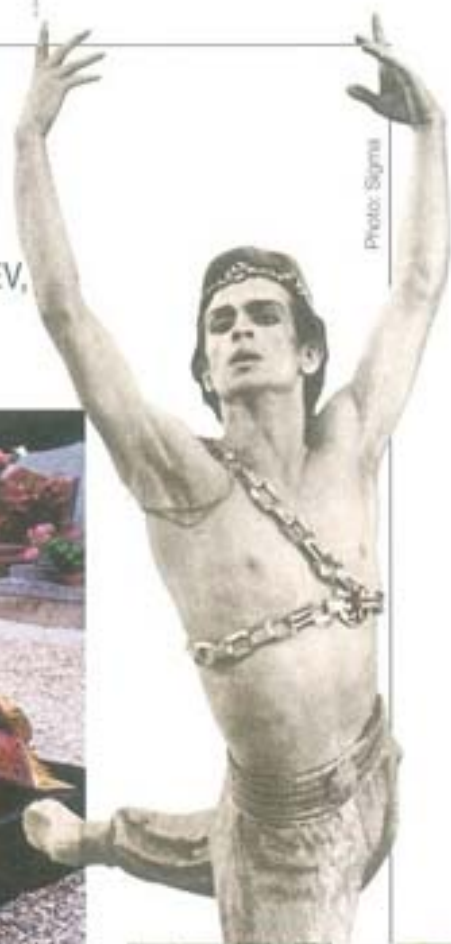
part of the building. The churchyard is in front of the main entrance on the eastern side near the heart of the residential area. Four large sails in reinforced cement embrace the central body of the nave of over 700 sq.m and divides the internal space of the building: the main hall, the chapel and the baptistery. Meier's project requires the maximum effort to exploit in the best way the material and the most advanced technologies used in the construction sector. The sails are self-supporting and realized in prestressed reinforced concrete. Italcementi will supply the know-how, the technical assistance and structural calculations besides guaranteeing the supply of concrete realized with a reinforced cement both white and grey, corresponding to the high characteristics of the work. The vast range of chemical products for construction instead will be supplied by Mapei that put at the disposal of the Church of the year 2000 also technical assistance services and project consultancy. In particular Mapei will supply adhesives, special hydraulic binders, concrete additives, waterproofing and protective compounds. The Pilkington Group will supply to the Church of the year 2000 a special clear insulated glass, pure and with a neutral colouration suitable for the maximum transmission of light. □

*The project of the Church
dedicated to "Dio Padre di
Misericordia", by
Richard
Meier*



On the tip of your toes

A PECULIAR SEPULCHRAL MONUMENT FOR RUDOLF NUREYEV,
OUR CENTURY'S GREATEST DANCER.



The mosaic replica of a kilim carpet covers the sarcophagus of Rudolf Nureyev, who is buried at the Orthodox Cemetery of Sainte Geneviève sous Bois in Paris. Art Director Ezio Frigerio, a co-operator and friend of the great dancer, and Stefano Pace, the Technical Manager of Opéra-Bastille of Paris, appointed a Ravenna-based mosaic workshop, Studio Akomena, to create this work on behalf on the Nureyev Foundation.

Although a carpet may appear to be a funny choice, it has certainly not been selected by chance: indeed, Nureyev was a passionate collector of art works and, in particular, he was so fond of Persian carpets that he always brought some with him, in his countless tours. This is the reason why his dearest friends

wanted the replica of one of those carpets to stay with him on his last journey.

To render the softness of the fabric, mosaic tiles were used in a smaller size than usual; also, they were hand-cut and hammered to be more watching. The four sq.m surface was covered in these tiles, with colours ranging in the red, blue and golden hues to give the impression of a fluid texture.

The mosaic workshop appointed Mapei to perform weather resistance tests of the materials used. The mantle support was made by sculpting polystyrene; on its surface, the mosaic tiles were applied with KERALASTIC, a two-component polyurethane adhesive that provides perfect water-proofing and adhesion for any type of tile and mosaic piece. □

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E-mail: MAPEI-GmbH@t-online.de
Distribution centres in Berlin, Lipsia, Neuss



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Distribution centre in Prago



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Plants in Vancouver and Laval
Distribution centre in Toronto



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Internet: <http://www.mapei.com>
Plants in Phoenix, Garland, New Jersey,
Fort Lauderdale, Chicago and Virginia
Distribution centre in Anaheim



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Plant in Singapore



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Plants in Ravenna and Villadossola (VB)

TOPCEM



CERTIFICATE No. 250
CERTICOM

This trademark
identifies the MAPEI
QUALITY SYSTEM



NORMAL SETTING
RAPID DRYING (7 days)
SPECIAL HYDRAULIC BINDER

