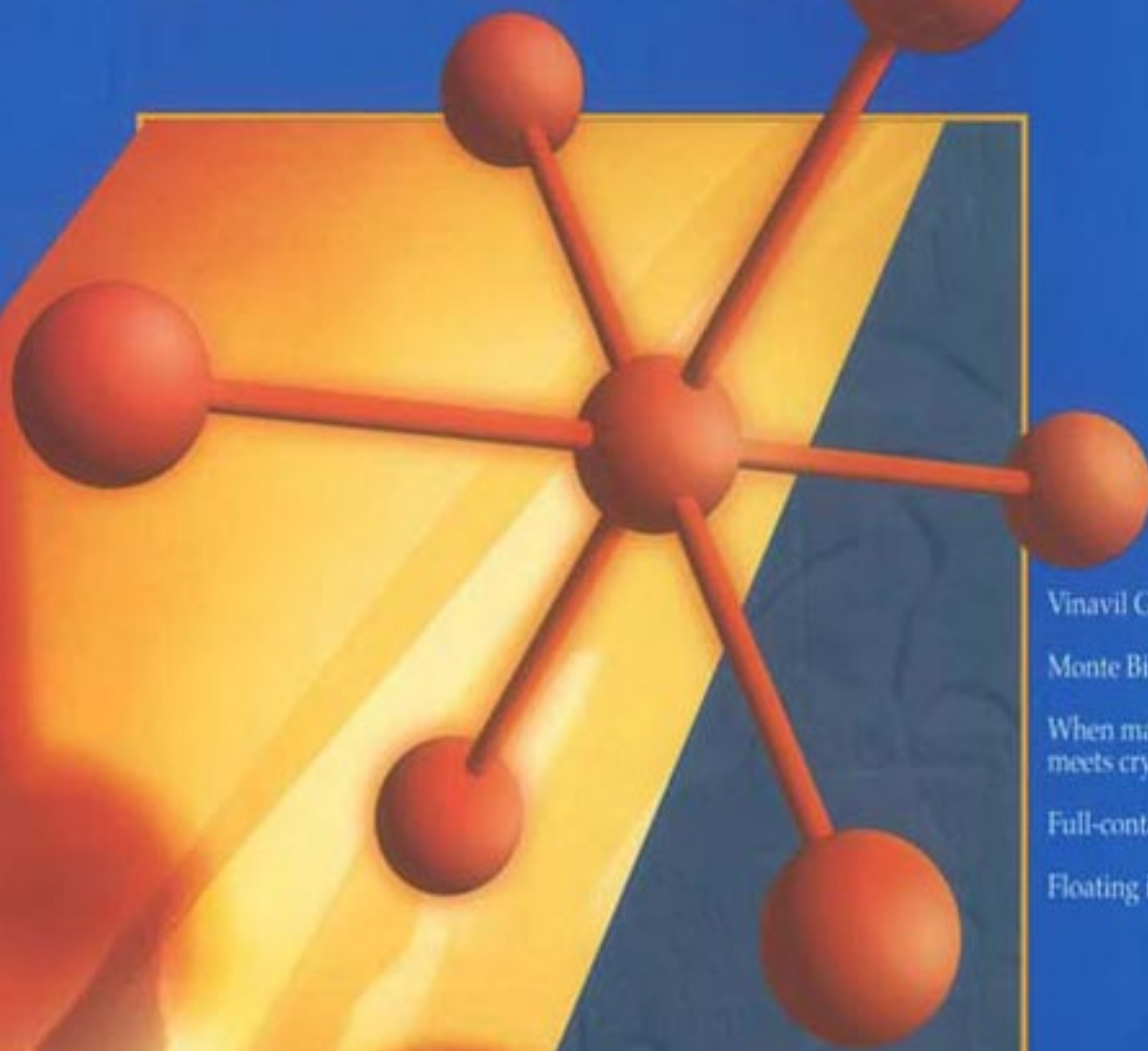


INTERNATIONAL

# REALTÀ MAPEI



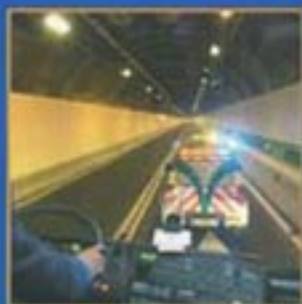
Vinavil Group

Monte Bianco Tunnel

When marble  
meets crystal

Full-contact adhesives

Floating in Nirvana



13





# Merchandise special

Mapei's merchandise catalogue has been updated. Some of the items illustrated in the publication are dedicated to the world of work (such as overalls and tools), while others have been created for leisure time and sport; and not only for cycling!

All the items featured may be ordered by Mapei's clients over the internet or by fax, by simply using the order form to be found in the catalogue itself.

All the goods in the merchandise catalogue may also be found in the

March 2003 Mapei Price List, which is reserved exclusively to Mapei's clients.

For those readers who are not clients, the goods in the merchandise catalogue are available from their local retailers.

You may  
also order  
Mapei goods  
on THE INTERNET  
realtamapei@mapei.it



We have picked out a selection of protective clothing for this page, from the wide range of goods on offer in the merchandise catalogue.

## Mapei & safety



High visibility coat  
Size

M L XL XXL



High visibility vest  
Size

M L XL XXL



High visibility  
overall  
Size

M L XL XXL



Safety helmet  
adjustable lining



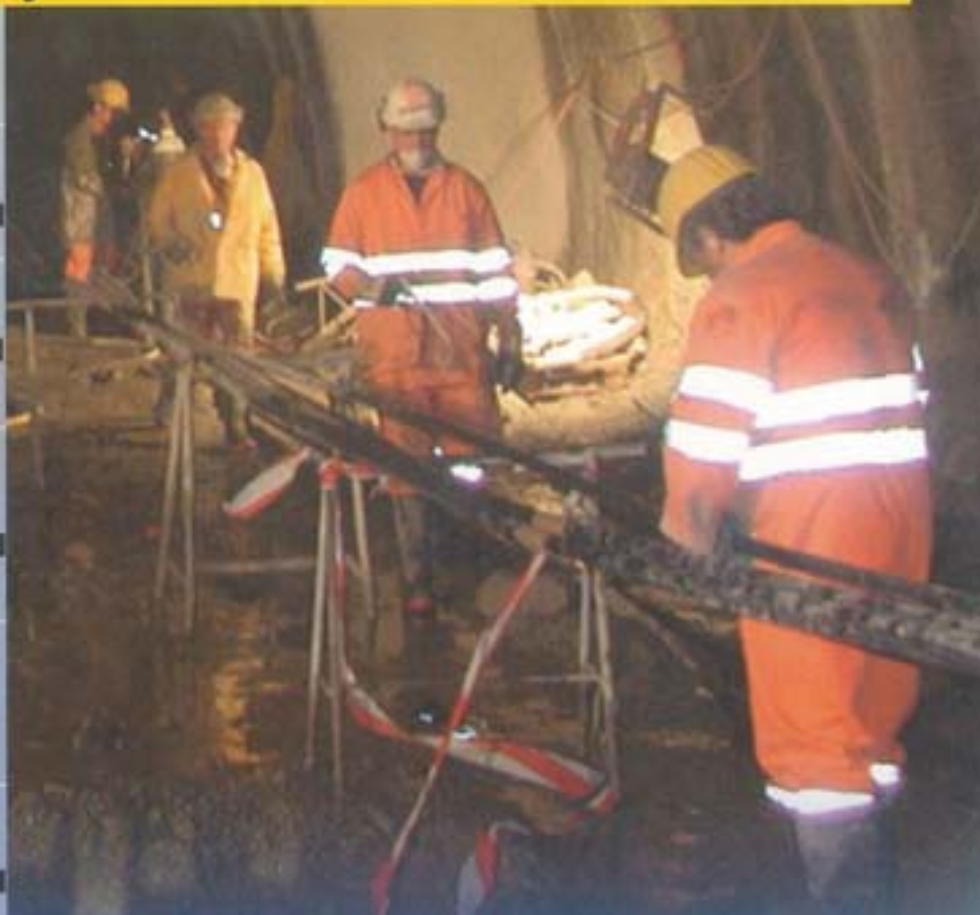
Accident prevention boots  
Size

40 41 42 43 44 45



Accident prevention shoes  
Size

40 41 42 43 44 45



If you would like further information, please contact your local Mapei Area Manager, or the company's Marketing Department by sending an e-mail to [marketing@mapei.it](mailto:marketing@mapei.it) or via fax at N° 0039/02/37673214.

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Main cover photo:  
*The Vinavil new graphic,  
a representation of a  
polymer. Vinavil is now  
expanding also in Egypt  
(article on page 2).*

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Vinavil Egypt	page 2
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[www.mapei.com](http://www.mapei.com)

The Mapei site contains all the information about the Group's products, its organisation in Italy and overseas, its involvement in the sector's main trade fairs and lots more.



## V I N A V I L

The Mapei Group has been operating in Africa since 2002 thanks to a new factory set up in Suez, Egypt, by the Vinavil Egypt company: an important new chapter in the group's long history.

Vinavil's own background coincides with the history of the Italian chemical industry. It first began operating in the 1940s as Rhodiatocce (Montecatini) in Villadossola before merging with Edison into Montedison in the 1960s. Meanwhile ENI set up a subsidiary chemical industry in Ravenna in the 1950s (ANIC) that later turned into Enichem. The merger of Enichem and Montedison in 1990 resulted in the creation of Enimont, that held onto Enichem Synthesis as a separate company for manufacturing emulsions and special products. Mapei entered on the scene in 1994, when, as one of Enichem Synthesis's biggest customers and world leader in floor adhesives, it took over its business. The new firm was



named Vinavil S.p.A., in honour of the "legendary" brand name of its most famous products, polyvinyl acetate polymers in dispersion, with two factories in operation: one in Villadossola for Vinavil products and the other in Ravenna for Ravemul/Raviflex products. The trademark is well known by everybody as the first and most famous "white glue".

Vinavil produces a wide range of products: binding agents for water paints, dispersions for adhesives, redispersible polymeric powders, solid

polymers for the chewing gum industry, beads for special uses, vinyl adhesives for "do-it-yourself", "tailor-made" special polymers.

Already for some time at the very fore of the fine and secondary chemicals industry, Vinavil obtained UNI EN ISO 9001 certification in 1995 and is also an active supporter of the "Responsible Care" international environmental programme. In 1997 it began a determined strategy to internationalise its business activities by setting up new



## Worldwide organization

- |                                       |                              |
|---------------------------------------|------------------------------|
| <b>HEADQUARTERS</b>                   | <b>PLANTS</b>                |
| ■ MILAN - Italy                       | ● VILLADOSSOLA - Italy       |
| <b>HEAD OFFICES</b>                   | ● RAVENNA - Italy            |
| ■ DEERFIELD BEACH (Miami FL) - U.S.A. | ● LAVAL - QUE - Canada       |
| ■ LAVAL (Montreal) - QUE - Canada     | ● WEST CHICAGO - IL - U.S.A. |
| ■ SUEZ - Egypt                        | ● SUEZ - Egypt               |
| ■ SINGAPORE                           |                              |



Villadossola (VB) - Italy

Ravenna - Italy





# EGYPT

 **VINAVIL**  
EGYPT

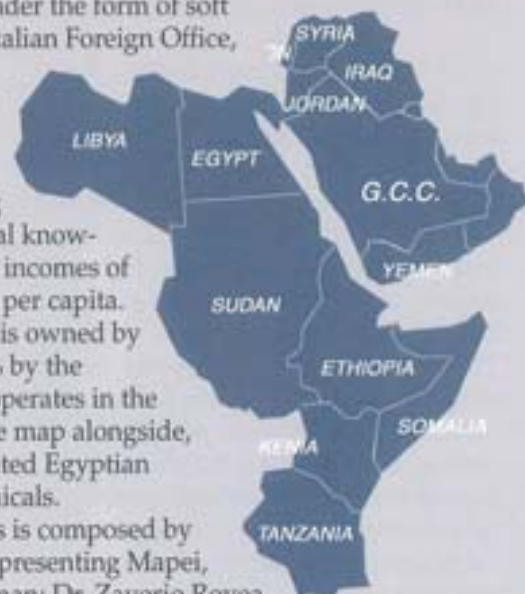
offices and factories in the USA and Canada, followed by a joint-venture in Egypt (Vinavil Egypt) in 2002 and a new entity – at present only commercial – in Singapore (Vinavil Far East). The operation leading to the creation of Vinavil Egypt was therefore part of this internationalisation programme. The distributors of Vinavil in the area, Tibah Chemicals and Obegi Chemicals, who were already operating in North Africa and the Middle East back in the 1980s, became immediately the obvious partners for developing further the market for Vinavil and Ravemul products, notably those designed for the paints, textiles and adhesives industries. Since ANIC had been exporting RAVEMUL polyvinyl acetate dispersions in the area back in the 1960s, gaining a leading position on the market, the decision to strengthen Vinavil's presence and increase sales in this rapidly growing area was consequential, and it was realised by setting up the joint-venture with offices, manufacturing and control laboratory directly on site so as to have an important base for manufacturing the large volume polymers, while carrying on the supply of more sophisticated products and special grades from the Italian plants.

The investment for Vinavil Egypt was about 10 million Euros, a small part of which under the form of soft loan financed by the Italian Foreign Office, which, according to art. 7 of law no. 49/87

is geared to encourage investments involving the transfer of technical know-how to countries with incomes of less than 1,250 dollars per capita. 50% of Vinavil Egypt is owned by the Mapei Group, 25% by the Obegi Group, which operates in the countries shown in the map alongside, and 25% by its associated Egyptian company, Tibah Chemicals.

The Board of Directors is composed by Dr. Giorgio Squinzi representing Mapei, who is also the Chairman; Dr. Zaverio Rovea and Eng. Patrizio Stecconi for Vinavil S.p.A.; Dr. Ayman Fahmy representing Tibah Chemicals; and Dr. Yordan Obegi and Dr. George Obegi for Obegi Chemicals.

The company main headquarters are in Cairo but the plant is in Attaqa, along the Suez Canal, in what used to be a desert area that was recently turned into an industrial district thanks to a redevelopment programme undertaken by the Egyptian Government, that also provided ten-year exemption from tax on profits in







accordance with art. 16 of law no. 8. Egypt has a strong potential deriving from its high population: 70 million inhabitants, with annual birth rate of 1.72%, which means the population will double by 2040. A definite lack of local manufacturers has resulted in high imports of products like those produced by Vinavil.

The country is currently opening up its domestic market by freeing foreign investments in line with policy aimed at paying off public debt. Italy is Egypt's second most important trade partner, but only seventh when it comes to direct investments: it is easy to sell, but investing is much more difficult. Apart from business with major industrial groups, small and medium-size companies do not operate much on the domestic market. Nevertheless, the country has plenty to offer foreign investors: the cost of labour is decidedly low for non-specialist work; six free-zones where almost tax-free investments can be made for re-exports; as regards production aimed at the local market, it is possible to invest inland in industrial areas on the outskirts of big cities, where tax free conditions are granted for 5-10 years. It follows that the decision to build a manufacturing facility on-site was determined by a combination of needs:

- 1) lighten up manufacturing at the Ravenna plant, thereby enabling production to be focused on other markets and products offering greater added value;
- 2) take advantage of cheap on-site production instead of exporting from Italy to supply markets in this area (Egypt, Syria, Lebanon, Saudi Arabia and other countries in the Middle East and North Africa);
- 3) strengthen business dealings with local



partners;

4) create a production unit on the local market capable of guaranteeing customers Mapei/Vinavil quality and productivity standards, also exploiting the distribution potential of the Obegi/Tibah network;

5) open up the Mapei Group's first production plant in Africa.

Despite the political uncertainty of the present moment in time, all the economic performance indicators suggest this is the right way ahead. Moreover, the fact that there is a port terminal not far from the production site for loading/unloading products has turned out to be a big logistical advantage in the choice of plant location.

Only Egyptian firms were involved in the construction of the factory under the supervision of the Engineering Management of Vinavil Italia, and work was completed relatively quickly, bearing in mind that the first stone was laid in November 2000 and normal production began in July 2002. About 50 employees work in the plant, which has a manufacturing capacity of over 30,000 tons/year – already set to increase. The works cover an area of about 17,000 m<sup>2</sup> and include the production plant, storage for raw materials (liquid and

*From the left:  
Ayman Fahmy  
(Managing Director,  
Vinavil Egypt) and  
Yordan Obegi  
(Member of the Board  
of Directors) Giorgio  
Squinzi (Chairman)  
Zaverio Rovati,  
Patrizio Steccani  
(Members of the  
Board of Directors)  
the day the work  
began.*





solid), the finished products warehouse and various infrastructures needed by a self-sufficient manufacturing site, such as steam generation, cooling water circuit, compressed air generation and quality control laboratory for raw materials and finished products.

The buildings for administration offices and other facilities cover about 4,500 m<sup>2</sup>. The factory officially opened on 31st December 2002, when the ribbon was cut by the Egyptian Prime Minister, Dr. Atef Ebeid in the presence of several other ministers and dignitaries, including the Governor of Suez, the Minister of Industry, the Foreign Secretary, the Minister of Oil, the Minister of Transport and many others (photo shown opposite). The Egyptian press attending the event gave it plenty of coverage in various daily papers featuring long reports.

A further event focused on Egyptian and Middle Eastern business men operating in the adhesives, wall paints and textile industries was then organised in February 2003, with about 175 customers also taking part.

A gala dinner was specially organised on the evening of Sunday 23rd, during which Fahmy, Squinzi and Rovea welcomed guests and introduced people to their company and its operations.





The dinner was held at the Sheraton Heliopolis Hotel in Cairo, where guests also spent the night.

On the morning of the 24th a number of coaches took them to Attaqa on a guided tour of the factory. At the end of the tour the guests returned to the hotel for a buffet/lunch with short introductory talks about the Mapei Group given by Dr. Squinzi, about Vinavil S.p.A. by Dr. Rovea and about Vinavil Egypt by Eng. Steconi and Eng. Said Osman. In the event, slides were also shown and selected topics of general interest were examined in greater depth.

The inauguration of Vinavil Egypt and the open day were also attended by officials from the Italian Embassy in Cairo, who showed much interest into the industrial initiative, for its potential developments. The day's success was helped along and further enhanced by the imminent opening of the Middle East Coating Show, a Middle East trade fair for products, machinery and raw materials for the paints and varnishes industry, which this year happened to be held on 25th-26th February in Cairo, after being held the previous year in Dubai. Vinavil Egypt had a high-profile stand at the event with its partners Tibah and Obegi Chemicals. Several customers and business operators came to visit, among which manufacturers of paints and adhesives and a number of traders, actual and potential customers and various organisations interested in setting up business dealings with the new Vinavil unit in Suez.



The Egyptian factory represents an important step in the investment programme Mapei has in mind for Vinavil, in terms of both achieving a more international status and in reaching its critical production mass, something which has virtually been attained with today's overall production of over 250,000 tons-a-year. As Dr. Rovea, Vinavil S.p.A.'s Managing Director, points out: "We have gone a long way: with production units

strategically located (Italy, USA, Canada, Egypt) to supply 5 continents and at the same time with the achievement of a healthy economic situation, Vinavil is now a key player in its sector, well positioned and ready to build further on these solid foundations and to expand onto new emerging markets".







# VINA-VIL GROUP

## VINA-VIL'S PRODUCTS

Vinavil S.p.A.'s best known product ever since the 1950s is a vinyl glue (the "white glue") in a characteristic red and white bottle that is so popular and

frequently used by young people. Vinavil is all around us as we go about our everyday lives. It is part of so many products, such as furniture, paintings, cardboard boxes, the walls of our homes, books and packaging.

Vinavil products are solvent-free, water-based dispersions guaranteeing extremely low emissions of volatile organic substances, used as raw materials for the water paints, textile accessories, adhesives and flexographic inks industries.



## RANGE OF USES

### The adhesives industry

Vinavil manufactures ethylene and vinylacetate based homopolymer and copolymer dispersions solving a range of different tricky gluing problems.



### Water paints

The availability of polymeric water binders allows the manufacture of water paints containing no volatile organic substances.

The Vinavil range includes polyvinyl acetate-ethylene dispersions that are all highly eco-compatible.



### Building Industry

Adhesives for tiles, mortar for carrying out repairs, grouts and thermo-insulating systems would be impossible without the range of binders, coming in the form of both water dispersions and redispersible powders, that Vinavil has to offer.



### Food Industry

Vinavil manufactures special solid polymers used as a base for chewing gum and polymer dispersions for the coating on certain hard-rind cheeses.



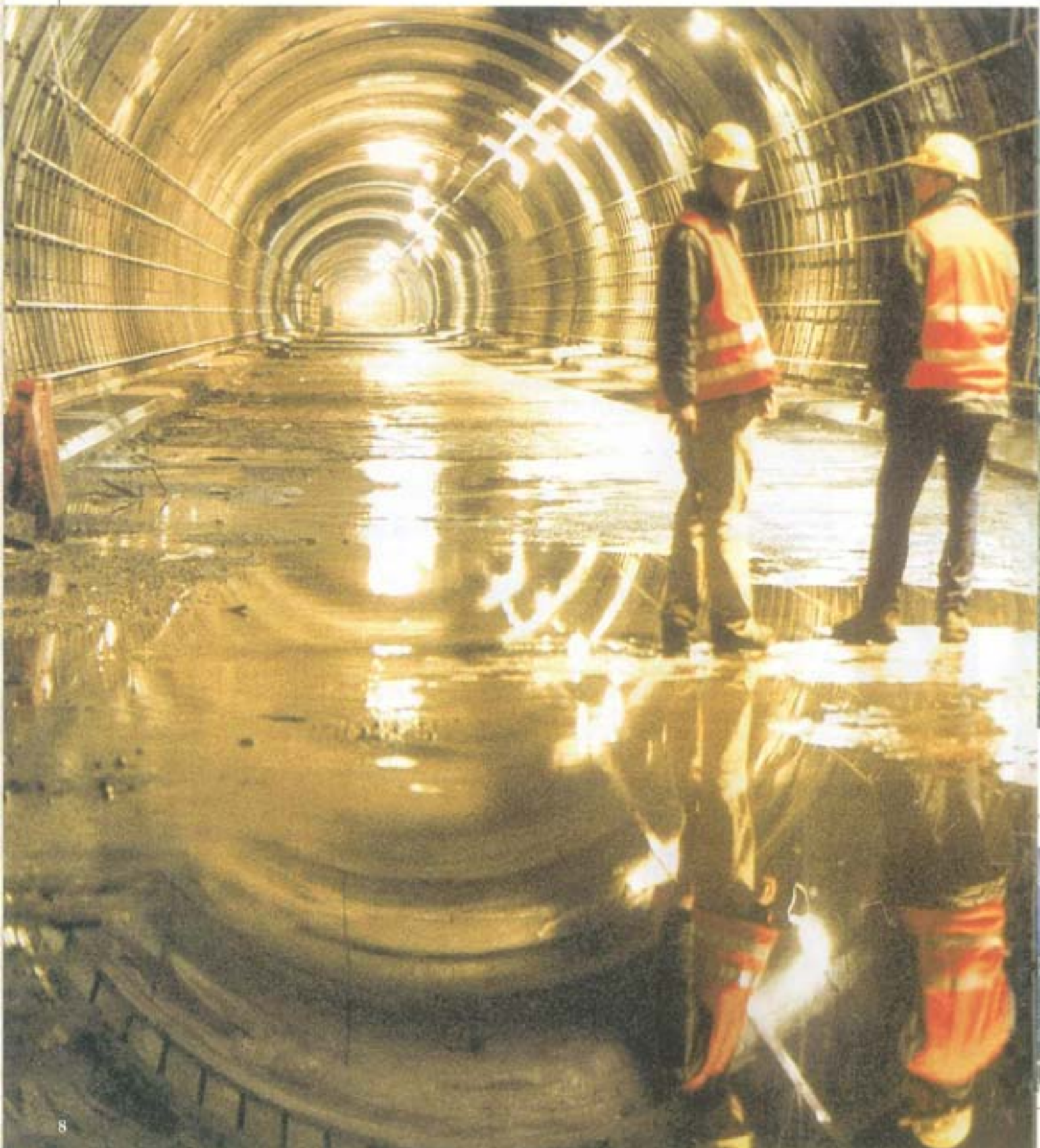
## POLYMERS FOR THE INDUSTRY





# Monte Bianco Tu

For a year now, the Monte Bianco Tunnel has been restored to its irreplaceable role as a communications route between Italy, France and the whole of north-eastern Europe beneath the tallest peak in Europe.





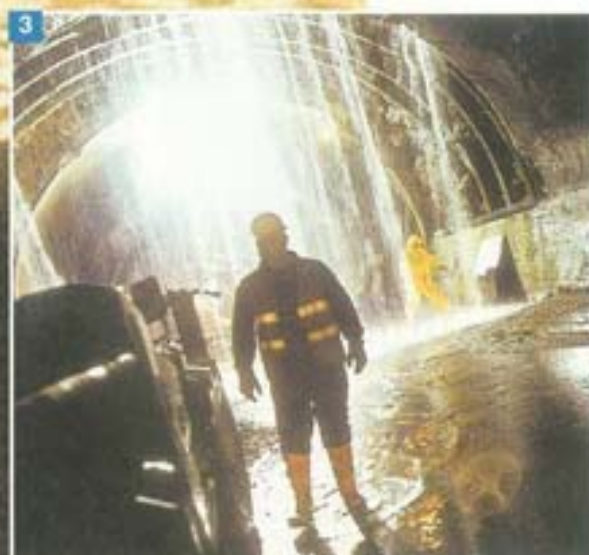
# nnel



**M**onte Bianco Tunnel re-opened in March 2002 after three years' work: a constant, unstoppable stream of light and commercial vehicles resumed its unbroken flow from Aosta Valley to Chamonix Valley and vice-versa, transporting hundred of thousands of people and millions of tons of goods to open-up fresh opportunities for growth and competitiveness on big markets for the Italian economy. The accident on 24th March 1999 that resulted in its closure seemed to have caused its premature and unexpected death, ending a dream dating back to even before the French Revolution. The tunnel was actually built in 1965 and over 46 million vehicles had travelled along its 11,600 metres over a period of 35 years.

The accident was caused by a Belgian lorry carrying flour and margarine that set off a fire that spread from the French side of the tunnel until it really burst into flames half way through.

Dozens of other vehicles behind the lorry were enveloped in the smoke and fumes, eventually catching fire, and despite the rescue attempts 39 people died in a matter of minutes. The blistering heat taking the temperature in the tunnel up to 1000°C and the poisonous fumes resulting from the combustion of materials caused considerable damage to the tunnel. An initial survey soon showed that the heat had



*Photo 1. The entrance to the tunnel while the works were going on.*

*Photo 2. Two technicians study a section of the Monte Bianco Tunnel rebuilt after a fire. Cutting-edge systems and technology were used to rebuild the tunnel to make it as safe as possible. (The photo is taken from Sette no. 26, 28th June 2001; our thanks go to the magazine for letting us use it).*

*Photo 3. Experts trying to stop water from seeping into the tunnel. Eventually stopped with the help of Mapei's RESCON T.*





6 even damaged the underground engineering works, jeopardising their safety.

A survey carried out by Italian-French experts in July that year recommended 41 measures to be abided by and carried out before re-opening the tunnel: repair work on the

damaged concrete of the vault and its support columns; collecting and channelling out water that had flowed into certain points of the vault, columns and ventilation channels and, most significantly, the reconstruction of the ventilation and smoke evacuation system in case of fire with a capacity of 150 m<sup>3</sup>/second over an area of 600 metres. The tunnel, whose re-opening was officially authorised by the Bonneville magistrates (the accident took place in a section under Italian control but in French territory) in summer 2000, was first decontaminated and then strengthened in its damaged parts. 1,350 metres of tunnel were re-built using special materials and introducing all the safety systems proposed by experts, so that when it was re-opened on 9th March 2002, technicians were entitled to claim that the Monte Bianco was the safest two-way tunnel in the whole of Europe. The repair work was not only carried out on tunnel structures, additional work was also undertaken to raise the safety standards to the very highest levels by means of innovative control and operating systems. This included four fire extinguishing tanks, 116 S.O.S. points fitted with emergency telephones, 37

ventilated and pressurised fire shelters, 116 suction vents placed at 100-metre intervals, and 116 new fume suction conduits in case of fires. While waiting to begin the civil engineering work, after carrying out a number of tests (including the fireproof test the French legal authorities asked for), the Società Italiana Traforo del Monte Bianco commissioned the Società Condotte d'Acqua to extend and construct 12 fire shelters and 3 garages along the Italian section of the tunnel; works that were quickly completed in a just a few months in 2000. The Italian-French consortium Scetauroute and Spea Ingegneria Europea were asked to put forward a project for all the repair and safety enhancement work, starting work on the utilities and other networks (radio, electricity and telephone systems).

The work, which kept to the design guidelines jointly drawn up by Scetauroute/Spea for the entire tunnel, began first on the Italian part commissioned to Cossi Costruzioni and then on the French part of the tunnel assigned to the Bonygues TP/GTM Dumez/Impregilo Consortium. All the work was carried out in accordance with specific "safety, quality control and environmental protection plans" agreed to by the commissioning firms; the specialist sub-contractors directly involved and those which won tenders for the works ensured everything was carried out in workmanlike fashion to the highest safety standards for workers on the building sites.





Photos 4 and 5.  
After carefully analysing the state of the tunnel, the concrete surfaces were water-scrubbed to remove the layer of concrete damaged by the fire and reveal the reinforcing bars.

Photo 6.  
Two different admixtures, MAPEFLUID N200 and MAPEFLUID X404, were used to obtain a durable and highly fluid concrete ideal for spraying on the surfaces.

Photo 7.  
The picture shows MAPEGROUT BM being sprayed on to repair the concrete.

Photo 8.  
An application of concrete set more quickly using MAPEQUICK AF100.

Photo 9.  
Mapei products stored on the building site near the tunnel entrance, also open in winter.

Photo 10.  
MAPEGROUT BM, a two-component cementitious mortar with low modulus of elasticity specially designed for repairing concrete, was used on the tunnel.



### Repair Work

Mapei was one of the firms that supplied materials for the building operations, developing over the years a range of products designed specially for the underground building sector used both for constructing new works and repairing damaged structures (even badly so, as in this case) by means of troubleshooting carried out on site, chemical/physical tests on materials and a special study into the mixes of concrete tested out directly in company laboratories.

At the beginning, an in-depth preliminary study had to be carried out to gather the necessary information required for designing the project, including the hydrogeological state of the tunnel so as to accurately gauge the amount of water that had seeped into it and its chemical characteristics, a careful assessment of the physio-mechanical features of the materials used to build the tunnel, so as to assess the risk of decay and their behaviour in case of fire, and a mapping of the broken bits and a general analysis of the damage to the inside of the tunnel.

After assessing the state of the tunnel, work began on cleaning the concrete surfaces using a water-scrubber to remove the layer of concrete damaged by the fire and also seriously jeopardised by all the water that flooded in. The thickness of the concrete removed depended on the amount of damage and the need to restore the tunnel to a height of 4.30 metres near the walkways. In some areas this meant removing all the lining. The need to remove either part or all of the concrete lining meant Mapei



technicians had to devise a number of different operations. The presence of so much water resulted in the anti-washout admixture, RESCON T\*, being used in the concrete.

### Removing all the lining

The rock in the areas where all the concrete was removed had to be reinforced in the wake of water-scrubbing operations. This was carried out by injecting cement-based slurries through the riveting in the rocks. The injections also contained EXPANFLUID\*, a powdered admixture for making fluid cement-based slurries with low water-cement ratios, no segregation and no shrinkage. After this, the tunnel lining was reconstructed using electrically welded meshing sprayed with concrete. Two different admixtures, MAPEFLUID N200\* and MAPEFLUID X404\*, were used to obtain durable, impermeable and highly fluid concrete with low water/cement ratios and high mechanical strength. MAPEQUICK AF1000\* and MAPEQUICK AF2000 setting accelerators were also used to ensure the concrete set right after it was sprayed on,





ensuring it was not washed away by any water seeping in and, most importantly, allowing it to stay in place on its own and not break off the support and fall to the ground.

These are alkali-free setting accelerators for making concrete with high mechanical strength that ensure safe excavations in order to apply permanent linings. MAPEPLAST SF\*, a microsilica-based powdered compact admixture with pozzolanic action, was added to the basic mix to make the concrete harder wearing. After spraying, the tunnel was re-profiled by another layer of cast concrete made even more fluid by adding MAPEFLUID X404\* and MAPEFLUID IF328\* hyperplasticisers, used in winter to make the concrete set and harden more quickly.

ADESILEX PG1\* was used for setting the rivets in place for holding up the electrically welded meshing, while the concrete was cured using MAPECURE E\*, an anti-evaporant in water emulsion sprayed on concrete surfaces to stop the paste water from rapidly evaporating. PLANITOP 100\*, a light-grey rapid-setting fine mortar, was used for the final smoothing of the surfaces.

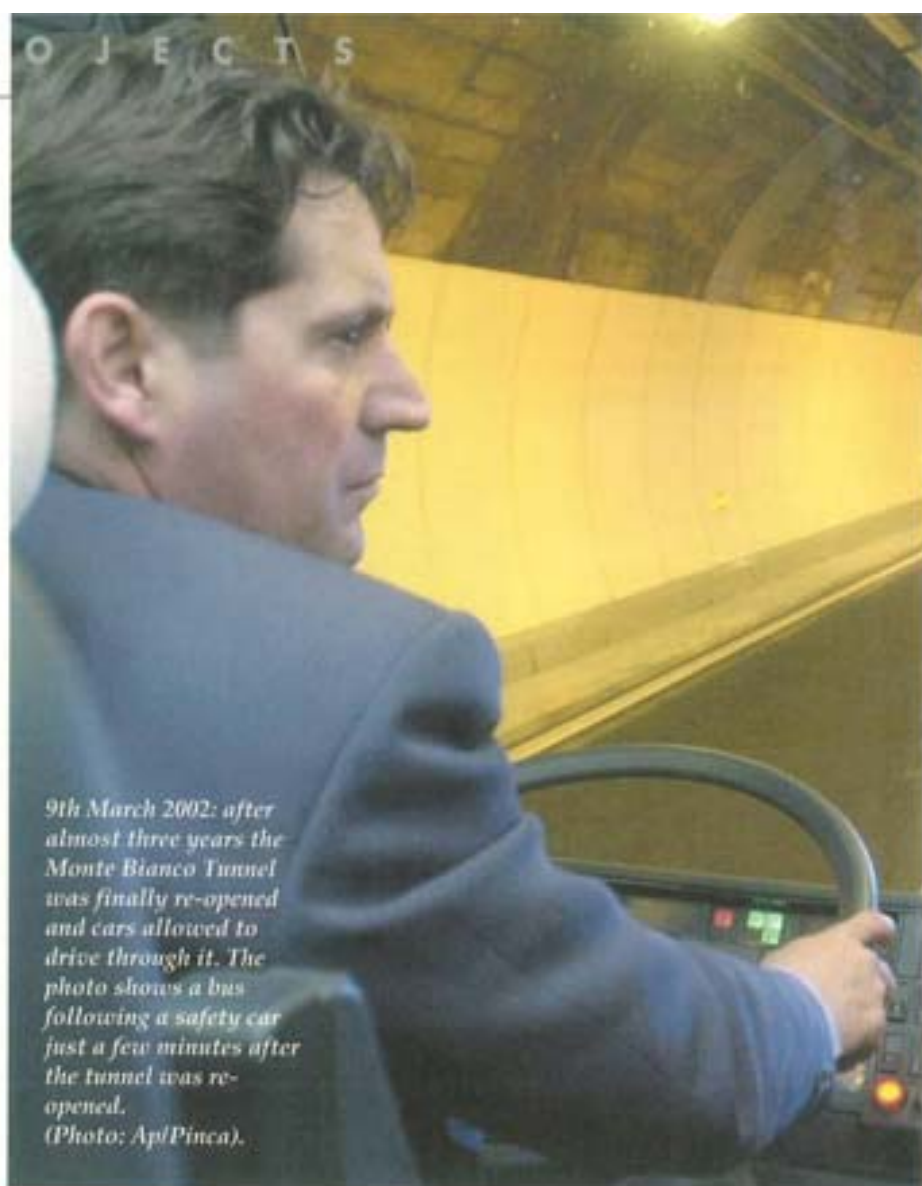
#### Partial removal of the lining

Different repair work was carried out on the areas where the lining was only scrubbed very superficially. This involved first knocking off the concrete and then cleaning the reinforcing bars to prevent them from rusting. Two layers of MAPEFER\*, an anti-rust mortar, were then painted on all the reinforcing bars, and the lining was then restored by spraying on MAPEGROUT T60\*, a sulphate-resistant thixotropic fibre-reinforced mortar. Work was completed by applying MONOFNIISH\*, a normal-setting cementitious mortar for smoothing concrete.

#### Repairing the air-supply tunnels

The air-supply channels placed beneath the road surface in the new project were converted into safe exit routes, and MAPEGROUT BM\*, a two-component cementitious mortar with low modulus of elasticity, was used for repairing the concrete involved.

For other parts of the tunnel, the lining was repaired using shrinkage-compensating concrete with EXPANCRETE\* expansive agent for concrete added or spraying on



*9th March 2002: after almost three years the Monte Bianco Tunnel was finally re-opened and cars allowed to drive through it. The photo shows a bus following a safety car just a few minutes after the tunnel was re-opened. (Photo: Api/Pinca).*

MAPEGROUT T60\*, whose special properties allowed all the gaps left after waterscrubbing operations to be suitably filled.

#### Other work

Part of the concrete road surface was also water-scrubbed, and the iron work was treated with MAPEFER\* and then repaired by applying MAPEGROUT THIXOTROPIC\*, a controlled-shrinkage fibre-reinforced grout. EPORIP\*, an epoxy-based brush-on adhesive, was first applied to improve bonding ready to handle heavy loads. MAPEGROUT THIXOTROPIC\* was then applied to this layer while it was still fresh to reconstruct the original road section. Everything was then covered with asphalt. Other operations carefully followed by Mapei also included waterproofing (before constructing the walkway) the connection between the road surface and supports using IDROSILEX PRONTO\*, a heavy-duty cementitious mortar ideal for combating all kinds of humidity. Before carrying out this operation, water was prevented from seeping in using LAMPOCEM\*, shrinkage-free fast-setting hydraulic binder, and LAMPOSILEX\*, ultra fast-setting and drying binder. For safety reasons, a metal channel was also fitted to collect any rain water dripping around the base of the supports. The channel was attached to the base using IDROSTOP\*, a hydrophilic expandable rubber section, and IDROSTOP MASTIC\*, a one component adhesive for fitting the section.

Finally, the surfaces of the concrete walls of the shelters were smoothed using clear-coloured MAPELASTIC\*.

It all took three years' hard and brave work, a genuine battle



Monte  
Mont

↑ 1161





against nature and bureaucratic/legal slowness, often inadvertently helped along by environmental/safety scruples and a fear of taking risks that were hard to calculate. 85% of the 700 billion old lira spent on the repair work was invested in tunnel traffic control systems drawing on all the world's latest and most sophisticated technology. The Tunnel through Monte Bianco became a "prototype"; it has been studied and analysed as a concrete example of the resourcefulness of the Italian business and labour markets, proof of the nation's great ingenuity.

#### TECHNICAL DATA

##### Monte Bianco Tunnel

**Works:** reinforcing, repairing and waterproofing of the tunnel's inside surfaces.

**Carried out:** 2000-2001

**Client:** Società Italiana Traforo del Monte Bianco, Rome

**Designed by:** Spea Ingegneria Europea, Milan and Scetauroute (France)

**Works manager:** A. Selleri, engineer at Spea Ingegneria Europea

**Builders:** Cossi Costruzioni, Sondrio

**Mapei products:** ADESILEX PG1, EPORIP, EXPANCRETE, EXPANFLUID, IDROSILEX PRONTO, IDROSTOP, IDROSTOP MASTIC, LAMPOCEM, LAMPOSILEX, MAPECURE E, MAPEFER, MAPEFILL, MAPEFLUID N200, MAPEFLUID IF328, MAPEFLUID X404, MAPEGROUT BM, MAPEGROUT T60, MAPEGROUT THIXOTROPIC, MAPELASTIC, MAPEPLAST SF, MAPEQUICK AF100, MAPEQUICK AF2000, MONOFINISH, PLANITOP 100, RESCON T.

**Mapei coordinator:** Mapei Underground Technology Team

"The products mentioned in this article belong to the "Underground Technology" line. The technical data sheets are contained in the "Mapei Global Infonet" CD, and at the [www.mapei.com](http://www.mapei.com) website.

**Adesilex PG 1:** thixotropic epoxy adhesive for structural bonding.

**Eporip:** epoxy-based adhesive for binding and monolithic sealing of cracks in screeds.

**Expancrete:** expansive agent for concrete.

**Expanfluid:** expanding agent for preparing fluid slurries with compensated shrinkage for injection.

**Idrosilex Pronto:** ready-to-use heavy-duty waterproofing cementitious mortar.

**Idrostop:** hydrophilic expandable rubber section for watertight joints, available in two sizes.

**Idrostop Mastic:** one-component adhesive for the installation of Idrostop.

**Lampocem:** ready-to-use shrinkage-free hydraulic binder with rapid setting and hardening.

**Lamposilex:** hydraulic binder with ultra fast setting and drying for plugging water leaks.

**Mapecure E:** curing compound in water emulsion.

**Mapefer:** two-component anti-rust mortar for reinforcing rods.

**Mapefill:** high-flow shrink-free grout for anchoring.

**Mapefluid N200:** superplasticising admixture for concrete

**Mapefluid IF328:** hyperplasticising admixture for concrete

**Mapefluid X404:** hyperplasticiser for concrete with low loss of workability

**Mapegrout BM:** two-component cementitious mortar with low modulus of elasticity for repairing concrete

**Mapegrout T60:** sulphate-resistant thixotropic fibrous mortar for repairing concrete.

**Mapegrout Thixotropic:** controlled-shrinkage fibre-reinforced grout for repairing concrete.

**Mapelastic:** two-component flexible cementitious mortar for the waterproof protection of concrete, swimming pools and balconies.

**Mapeplast SF:** microsilica-based powdered additive with pozzolanic action for high-quality mortar and concrete

**Mapequick AF100:** "alkali-free" setting accelerator for shotcrete and sprayed mortar.

**Mapequick AF2000:** "alkali-free" setting accelerator for concrete and sprayed mortar.

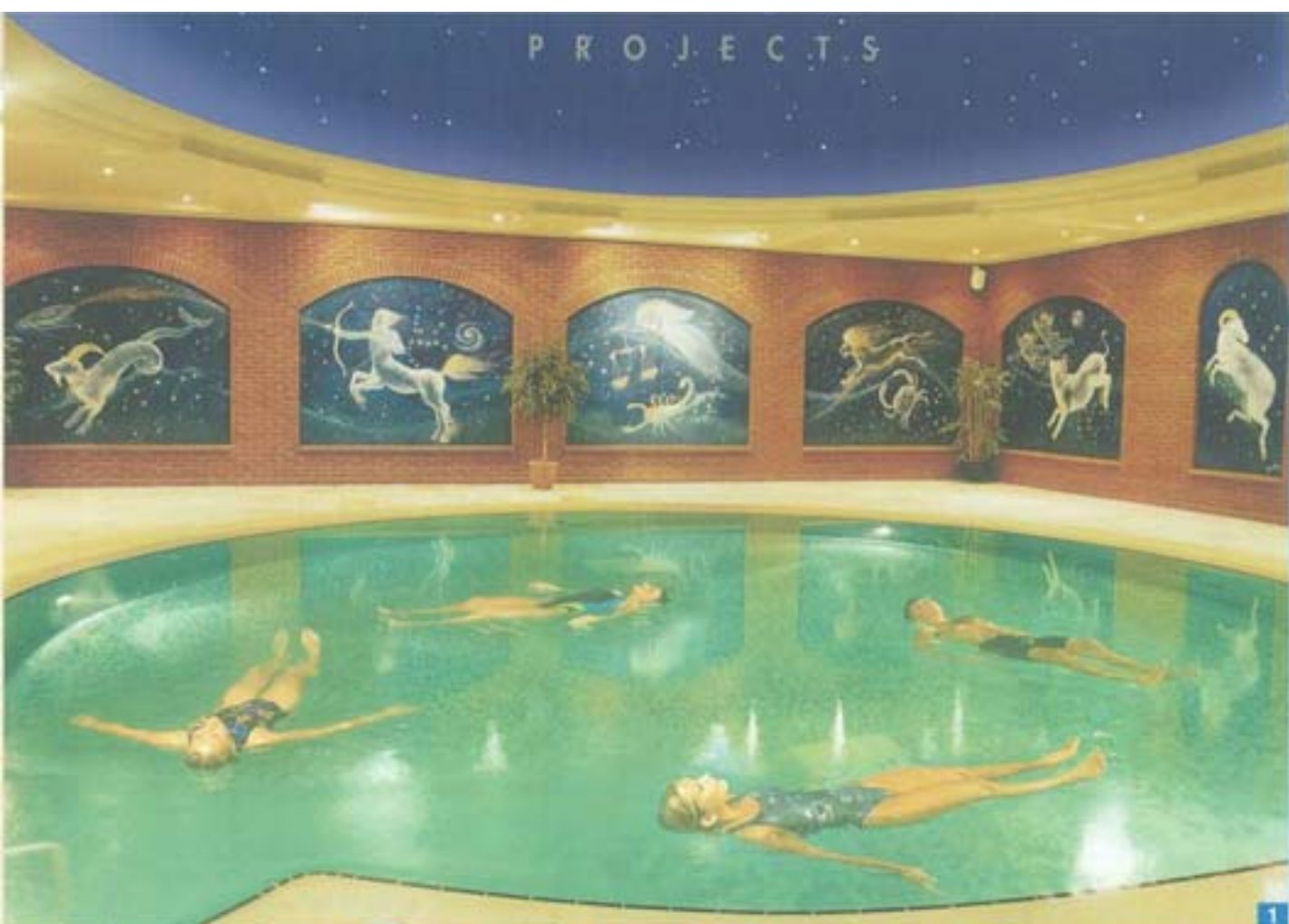
**Monofinish:** one-component normal-setting cementitious mortar for smoothing concrete.

**Planitop 100:** light-grey rapid-setting fine mortar for repairing and smoothing concrete and renders.

**Rescon T:** anti-washout admixture for underwater casting.







# FLOATING in Nirvana

After being modernised and extended, this English spa and leisure complex has now opened its luxurious, new pools.

An experience worthy of its reputation. The Nirvana Spa in Wokingham, one of the best known and most luxurious in England, can now offer its many customers new services and facilities designed for health and relaxation purposes.

First opened in 1988, the complex has been modernised and extended several times (in 1993, 1996 and 2001) based on a very distinctive way of thinking. The idea was to create a welcoming shelter, an oasis of tranquillity cut off from the outside climate and, at the same time, provide club members with the chance to try out a more healthy lifestyle in a relaxed setting.

## New Spaces and New Health Experiences

The common denominator in all the facilities is water: members can actually choose from nine different pools, each "specialising" in something and furnished with the latest technical systems. The pools are all set in theme rooms. The latest work, completed in summer 2001, involved the construction of new rooms (Celestial Room, Ocean Room and Roman Room) and three Plunge Pools (for water-therapy treatment). The Relaxation Pool and Surf Room (where the water-therapy Spa is located) have also been modernised.

The Celestial and Ocean rooms are devoted to flotation: guests float effortlessly on the

*Photo 1. Relaxation under the Celestial Room's starry vault.*

*Photo 2. The Spa swimming pool for water-therapy, treatment restructured and enlarged in 2001.*

*Photo 3. Classic style setting of the Roman Room.*



water propelled by jets which create the kind of suspension effect you feel in the absence of gravity. They are ideal for treating people suffering from rheumatism or arthritis, thanks to high concentrations of mineral salts from the Dead Sea. The Celestial Room is also embellished with a ceiling fitted with optic fibre lighting creating a "starry sky" effect.

These and the rest of the Nirvana pools use water from a natural spring. Nirvana "brand" water is now even bottled and sold.

#### Roman Atmospheres

The new facilities also include three small Plunge Pools (two in the Surf Room and one in the Ocean Room) for heat therapy treatment: brief immersions in water heated to a lower temperature than the rest of the pools. This is, in some respects, reminiscent of the customs of the Ancient Romans, who used to first visit the tepidarium (warm water spa) and then the calidarium before finally bathing in the cold water of the frigidarium.

The complex's main attraction is certainly the Roman Room, a spa built in classical style with a Roman vault and columns reminiscent of ancient cathedrals. This pool is surrounded by windows looking onto a patio, sheltered, in turn, from the outside by a thick screen of plants designed to guarantee guests' privacy.

#### Work

Mapei products were used for all the rooms and pools involved in the work carried out in 2001: the Relaxation Pool, Roman Pool, Ocean Room, Celestial Room and Surf Room.

The Relaxation Pool covering an area of 150m<sup>2</sup> is the centre's "historical" spa, the first to be built back in 1988. It was once the focus of everything going on at Nirvana Spa. Like all the others in the complex, its pool used IDROSILEX\*, an integral waterproofer for cement-based mortars, mixed with sand and cement to obtain a waterproof render. MAPELASTIC\*, a two-component flexible

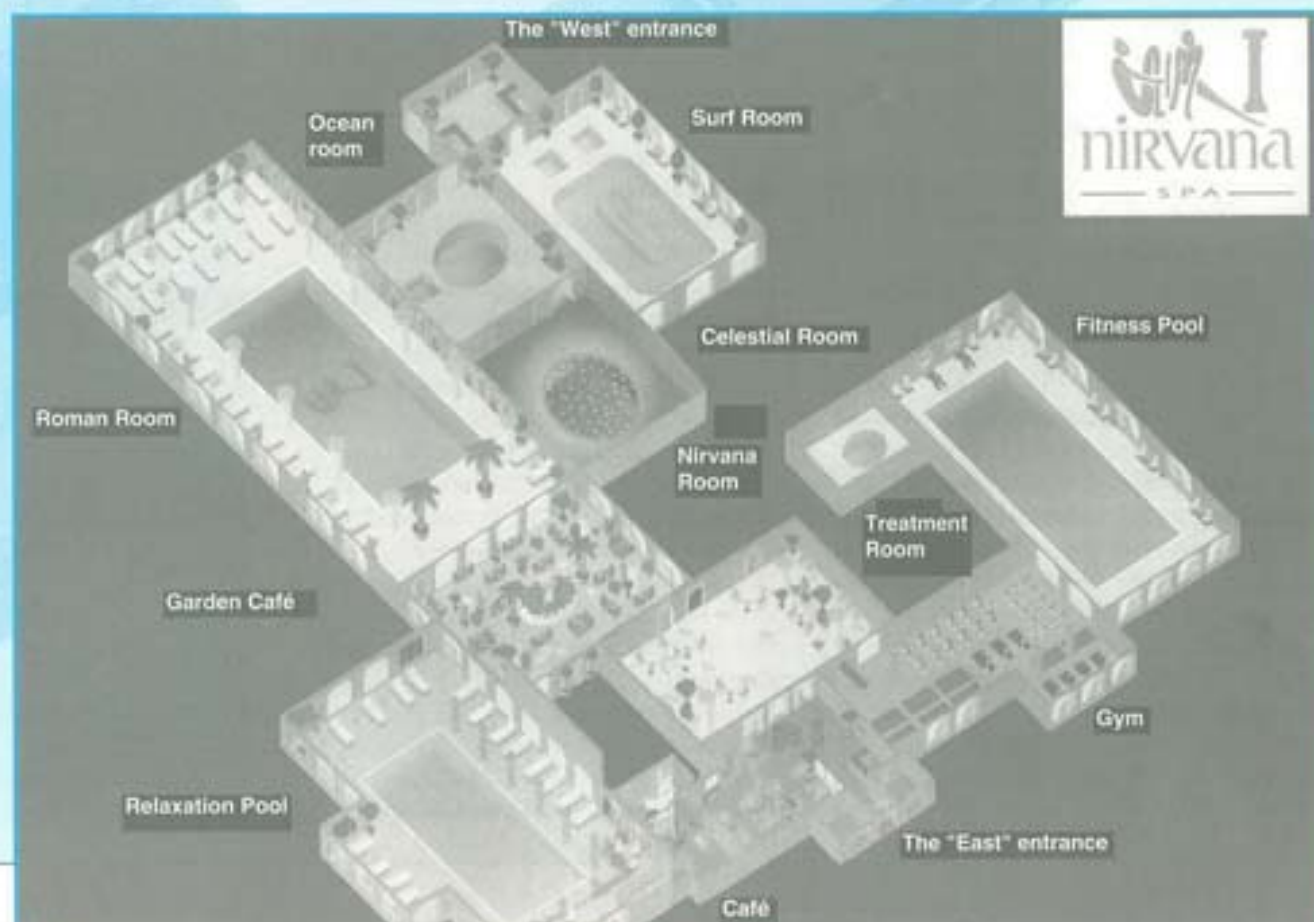
cementitious mortar ideal for waterproofing and sealing balconies and swimming pools, was then applied.

Bisazza Mauritius vitreous mosaic tiles were then laid using GRANIRAPID\* two-component adhesive quick setting and fast hydration system. Grouting was carried out using the easy-to-clean acid-resistant epoxy mortar KERAPOXY\*, which is also resistant to the aggressive substances found in the pool water.

An Indian sandstone floor was laid in the surrounding area over a screed of sand and cement covering a surface of almost 1,000 m<sup>2</sup>. It was laid using ADESILEX P4\*, a fast setting, medium-deformable full contact cementitious adhesive.

The grouting was carried out using ULTRACOLOR\*, a rapid setting and drying grout, that does not produce efflorescence, in the colour Beige 2000. Indian sandstone was also used for the wall coatings, applied using GRANIRAPID\*. Again, the grouting was carried out using ULTRACOLOR\*. The Roman Room's magnificent pool was made using the same products. The Indian sandstone was also laid in this "ancient Rome"-style room, grouted with ULTRACOLOR\* Beige 2000 which blends perfectly into the setting.

Mapei products are also featured in the Surf Room, a real paradise for water therapy thanks to the Spa pool fitted with 49 sprinklers for the jets of water spurting







out at a set temperature of 35 degrees. Mapei products turned out to be ideal for taking the pressure: the jets are so powerful that the water can shoot up to 60 cm above the surface. The two adjacent water-therapy Plunge Pools used NIVRORAPID\* fast setting thixotropic cementitious levelling mortar, even suitable for vertical surfaces. One of the Nirvana complex's main attractions is the Celestial Room. The 80 m<sup>2</sup> pool built inside this visually striking room serves floatation purposes, as does the pool in the Ocean Room. The use of Mapei products ensured both these pools were great successes. Mapei products were also used for the showers, locker rooms and utilities, including KERAPOXY\* acid-resistant epoxy grout and MAPESIL AC\* solvent-free, mildew-resistant, acetic-crosslinking silicone sealant.

#### A New Use for MAPELASTIC\*

The project is particularly interesting for the special use of MAPELASTIC\* based on a method of application developed by Watertite Solutions Ltd., a firm (founded in 1987) specialising in solutions for the swimming pool industry. Hairline cracks in the pool render or concrete structure have traditionally caused major problems in the construction and operation of pools. MAPELASTIC\*, which can be applied directly to the concrete structure or render, completely eliminates these hairline cracks, making the whole structure completely watertight. Instead of trowelling the MAPELASTIC\* onto the

substrate, a low pressure spraying process is used, which is up to six times quicker and achieves a consistent application thickness without any wastage. Sean Barley of Nirvana stated that "This is the perfect solution for pool linings. Whether or not it is a new building or refurbishment project, we are convinced that we can make great savings in time and money and produce a quality that is second to none". MAPELASTIC\* is a multi-purpose product that can also be used to protect concrete foundations and basements, retaining walls, pre-cast concrete structures etc. It is the ideal protective coating for concrete surfaces that are subject to chemical attack from de-icing salts and sulphates, and it can be used as a waterproof membrane under interior and exterior ceramic tiles. Philip Breakspear, Sales Director for Mapei UK Ltd., is delighted with the results of their collaboration with Watertite Solutions Ltd. and Nirvana. "We are working side by side with Sean Barley with so many products. Mapei always like to work closely with professional installers and specifiers to ensure their high performance products are used to their best advantage". The Nirvana complex won the "Spa of the Year" award for 2002, and the building is also on a special list of BBC venues and film locations. The complex has already been used as a set for filming scenes from "Changing Rooms" and a music video starring Robbie Williams and Kylie Minogue.







3

\* The products referred to in this article belong to the "Building Products" and "Products for Ceramics and Stone Materials" ranges. The technical data sheets are available on the CD entitled "Mapei Global Infonet" and at the Internet site:

[www.mapei.com](http://www.mapei.com).

The Mapei adhesives and grouts conform to EN 12004 and EN 13888 standards.

**Idrosilex:** an integral waterproofer for cementitious mortars

**Mapelastic:** a two-component flexible cementitious mortar ideal for waterproofing and sealing balconies and swimming pools

**Granirapid (C2F):** two-component quick setting and drying adhesive for ceramic tile, naturals and agglomerates (up to 10 mm adhesive thickness)

**Kerapoxy (RG):** two-component acid-resistant epoxy mortar for grouting joints of minimum width 3 mm. Available in 26 colours

**Nivorapid:** fast drying thixotropic cementitious levelling mortar, also suitable for vertical surfaces

**Adesilex P4 (C2F):** a rapid setting, medium-deformable full contact, cementitious adhesive for ceramic tiles

**Ultracolor (CG2):** rapid setting and drying grout for joints 2-20 mm, available in 26 colours; it does not produce efflorescence

**Mapesil AC:** solvent-free, mildew-resistant, acetic-crosslinking silicone sealant, available in 26 colours and transparent



## TECHNICAL DATA

**Nirvana Spa & Leisure - Wokingham, Beckshire, Great Britain**

**Built:** 1988

**Modernised:** 2001 (previous work carried out in 1993 and 1996)

**Project:** Nirvana Spa & Leisure

**Material laid:** Bisazza Mauritius vitreous mosaic tiles (for the pools) and Indian sandstone (for coating both the walls and floors of the corridors and locker rooms)

**Mapei products used:**

- for the pools: IDROSILEX, MAPELASTIC,

GRANIRAPID, KERAPOXY, NIVORAPID

- for the floor coatings of the corridors around the

pools: ADESILEX P4, ULTRACOLOR

- for the wall coatings: GRANIRAPID,

ULTRACOLOR

- for the utilities, showers, locker rooms:

ADESILEX P4, ULTRACOLOR, KERAPOXY

and MAPESIL AC

**Mapei Consultant:** Philip Breakpear.



# DYNAMOMON SYSTEM

**Mapei for  
Large  
Engineering  
Projects**

**NEW**



**D**ynamon System is Mapei's new range of superplasticisers for eliminating the steam curing process of precast components, maintaining long workability of ready mixed concrete and for large construction projects.

These revolutionary admixture are based on DPP (Designed Performance Polymer) technology, the new chemical process which, by means of the complete design and production of monomers (an exclusive Mapei know-how), is able to model the characteristics of the admixtures according to the specific performances required for the concrete.

## New: the Dynamon SX range for large construction projects

Large construction projects have always been an important driving force for the whole of the Italian economy, thanks to large civil engineering infrastructures both in Italy and abroad. Today's large project market has become globalised, and even the scenario for individual companies is undergoing considerable changes, through new joint-ventures which impose an in-depth knowledge of advanced technology and innovative construction techniques. The combination of these two factors is destined to contribute enormously to an increase in the profitability of the construction sector. In other words, with fewer construction projects, larger profit margins will be achieved together with a longer service life of the construction itself.

These considerations have led Mapei to developing a new range of superplasticising admixtures for concrete, characterised by their considerable scientific innovation: **Dynamon SX**, which includes DYNAMON SX and DYNAMON SX14.

These are admixtures which have been specially designed for the development of new technology such as Self-Compacting Concrete (SCC), High Performance Concrete (HPC) and Reactive Powder Concrete (RPC), or for traditional concrete used on a daily basis in the construction industry, and which offer technical and economical performances which were unattainable in the past, with the twin aim of the highest quality with a reduction in site costs.

The Dynamon SX range, which joins the ranges of products for the ready-mixed concrete industry (Dynamon SR) and for the precast concrete industry (Dynamon SP), is characterised by its very high water reduction capacity, excellent maintenance of its workability and an increase in mechanical strength.

Thanks to its high workability capacity (S4 or S5 consistency class according to the EN 206 standards), concrete manufactured with Dynamon SX is easy to lay when fresh and has high mechanical properties when set.

Dynamon SX admixtures are also particularly suitable for manufacturing self-compacting concrete, because they guarantee high fluidity of the mix without the negative effects due to the excessive stickiness of the material, a problem which often occurs with the use of other superplasticising admixtures, especially when large doses are used.

## Mapei for the ready-mixed concrete industry

The ready-mixed concrete sector in Italy is becoming more and



more specialised, and is developing into its very own highly professional industry. This is why ready-mixed concrete manufacturers feel that nowadays, more than ever before, highly reliable and high performance raw materials are required for their production facilities.

These are the reasons which have led Mapei to developing the **Dynamon SR** range, a specific product for the ready-mixed concrete market. The range is made up of three superplasticising admixtures: DYNAMON SR1, DYNAMON SR2 AND DYNAMON SR3, gauged to obtain and maintain excellent workability in various environmental temperatures.

At the same time, a high water reduction capacity and increase in the mechanical properties of the concrete is guaranteed, thus ensuring high quality and a long service life of structures in reinforced concrete.

The admixtures in the Dynamom SR range are also particularly useful for manufacturing self-compacting concrete, because they guarantee a high fluidity of the mix without producing, on the other hand, negative effects such as an increase in its viscosity and subsequent stickiness.

### Mapei for the precast concrete industry

The precast concrete industry is in continuous technological development. In the last few years, it has developed especially in the industrial constructions sector, where the main requirement is the manufacture of structures in continuously lower times to reduce the investment costs. In fact, the primary aim for manufacturers of precast elements is to obtain the mechanical properties requested for the various elements in the shortest time possible. Nowadays, to reach these goals, manufacturers accelerate the curing time of the cast elements by using steam. Apart from the economic disadvantages, there are, above all, disadvantages in the performance and durability of the precast elements. There is also a further negative factor; the formation of internal micro-cracks in the structure, due to the high tensile stresses caused by the thermal conditions to which they are subjected. These cracks may seriously compromise the use of the structures. In order to overcome these problems and give a large contribution to the innovation and development

of this sector, Mapei has developed the Dynamon SP range, specifically for the precast concrete industry.

The range is made up of three superplasticising admixtures, DYNAMON SP1, DYNAMON SP2 and DYNAMON SP3. They are gauged for the progressive and complete elimination of steam curing of the cast elements and, as a result, an increase in the durability and service life of structures in reinforced concrete.

The admixtures in the Dynamom SP range are also particularly suitable for manufacturing self-compacting concrete.

*These products are part of the "Admixtures for concrete" range. Their relative technical data sheets may be found on the "Mapei Global Infonet" CD and on the web site "www.mapei.com".*



## The new Mapei line of acrylic superplasticisers:

### Large Engineering Projects

#### **Dynamon SX**

Superplasticiser based on modified acrylic polymer with high range water reduction for traditional and self compacting concrete.

#### **Dynamon SX 14**

Superplasticiser integrator of fine graded aggregate for ready mix concrete with low slump loss and high range water reduction of the mixture.

#### **Dynamon SX 08**

Superplasticiser based on modified acrylic polymer for concrete with high mechanical strength and low loss of workability.

#### **Dynamon SX 18**

Accelerating superplasticiser based on modified polymer for concrete with good retention of workability.

### the Ready Mix Concrete Industry

#### **Dynamon SR1**

Superplasticiser based on modified acrylic polymer for ready mix concrete with low water/cement ratio, very high mechanical strengths and long slump retention.

#### **Dynamon SR2**

Superplasticiser based on modified acrylic polymer for ready mix concrete with low water/cement ratio and very long slump retention in hot climates.

#### **Dynamon SR3**

Superplasticiser based on modified acrylic polymer for ready mix concrete with low water/cement ratio, extremely high mechanical strengths and long slump retention.

### the Precast Concrete Industry

#### **Dynamon SP1**

Superplasticiser based on acrylic modified polymer for precast concrete with low water/cement ratio and very high mechanical strengths at early and final age.

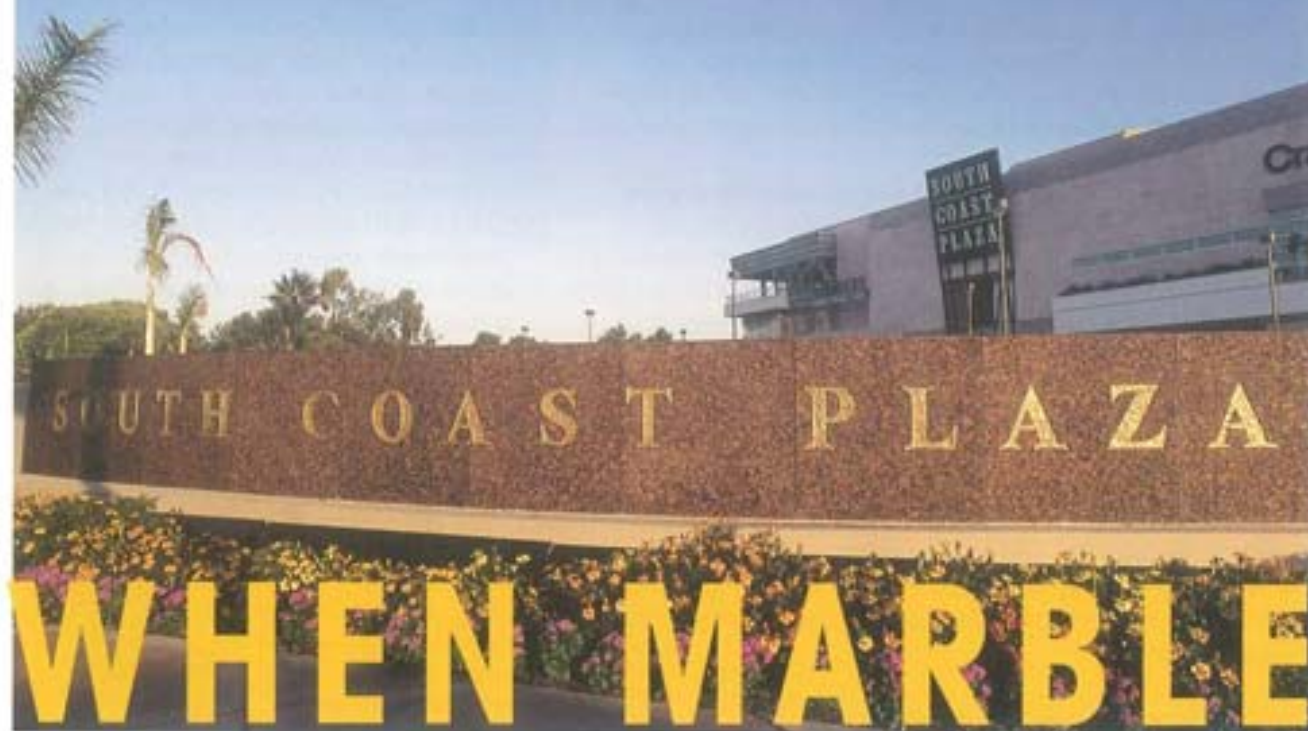
#### **Dynamon SP2**

Superplasticiser based on acrylic modified polymer for precast concrete with low water/cement ratio and very high mechanical strengths at early age, also at low environmental temperatures.

#### **Dynamon SP3**

Superplasticiser based on acrylic modified polymer for precast concrete with low water/cement ratio and very high mechanical strengths at early age in winter time, without steam curing.





# WHEN MARBLE meets CRYSTAL

The architectural designers renovating the Crystal Court in the South Coast Plaza Mall in California decided to opt for marble laid using Mapei products.

**F**rom America to Italy and back: the idea that shopping malls are no longer just places for making purchases but multi-purpose attractions for all kinds of customers originally came from the other side of the ocean, but it has since been imported into "old Europe". Now it is Italy's turn to introduce something new and of real quality into lots of American products through Mapei products. One of the numerous examples of this is the South Coast Plaza Mall in Costa Mesa, California. This mall - shown in the pictures in this article - proudly shows off the results of the renovation project designed to enhance and expand its premises. The area involved in the work, the Crystal Court, covers an area of approximately 7,000 m<sup>2</sup>, built over three levels.

#### Extension and Renovation

The extension consisted of using the KERALASTIC SYSTEM\* to lay about 4,000 m<sup>2</sup> of marble and natural tiles. Although there was no need to use rapid setting products, the KERALASTIC SYSTEM\* was chosen for its flexibility, a

must for any multi-storey structure. This system's special bonding strength, greater resistance to vibrations and bumps and bangs, and notable resistance to freeze-thaw cycles, provide







the required flexibility. KERALASTIC SYSTEM® is the ideal product for difficult-to-bond natural stone and large porcelain tiles. In addition to the new spaces, the works also involved an area of 3,000 m<sup>2</sup>, over three levels, in need of renovation. Project Manager Jim Smotherman of Callison Architects, a specialist firm of retail architects, explained the purpose behind the renovation.

The project was supposed to take the three-level centre, anchored by the Macy's and Robinson's May buildings, and redesign its interiors. The idea was to "freshen" up its look using a new flooring featuring a blend of limestone and marble, which, at the same time, would ensure it was still compatible with the old centre. As Smotherman pointed out: "It was important to have grout systems that worked with all these stones both from a colour and performance standpoint. We chose Mapei's line of grouts due to the fact that they have an excellent grout selection. We have used them frequently in the past and decided they were still our choice product for this project, opting for KER 200 in the ivory colour."

PRP 315® waterproofing membrane was also used for the restrooms.

#### **All in a night**

"We specialize in mall renovations," so Mark Lui from the Corradini Corporation





in charge of operations told us. As he went on to say, "It is very important to be able to accommodate crowds during the works and, at the same time, meet our tight schedules. For this renovation, we used a two-shift system and never had to close the mall."

"We also needed a rapid setting and flexible product to allow foot traffic to resume only hours after installation," so the head of Corradini added as he explained why the GRANI/RAPID SYSTEM\* was chosen for the three levels of renovated areas (3,000 m<sup>2</sup>).

Lui emphasised that "The GRANI/RAPID SYSTEM\* was great: it allowed for foot traffic the following morning."

The Crystal Court's freshly laid marble tiles have already been admired by thousands of visitors.



#### TECHNICAL DATA

**South Coast Plaza Mall – Costa Mesa, California (USA)**

**Project:** extension and renovation of the Crystal Court

**Built:** 2000

**Surface area involved:** 7,000 m<sup>2</sup> (4,000 m<sup>2</sup> extension and 3,000 m<sup>2</sup> renovation)

**Project Managers:**

- Dan Baldwin from Bayley Construction in charge of supervision at the time of the works

- Jim Smotherman from Callison Architects

**Material used:** marble and natural stone

**Installation Firm:** Corradini Corporation (supervised by Mark Lui)

**Mapei Products:** KERALASTIC SYSTEM\*, GRANI/RAPID SYSTEM\*, KER 200\*, PRP 315\*

**Mapei Retailer:** Dal Tile City of Industry

**Mapei Consultant:** Dan Walgren

*\* The products referred to in this article are manufactured and distributed on the American market by Mapei Corp. (USA) and Mapei Inc. (CDN). For further information visit the Internet site: [www.mapei.com](http://www.mapei.com).*





# Let's meet AT THE MALL



Buying is no longer enough. Shopping malls have turned into meeting and leisure places. The touch words are modernity, style and quality.

**G**one are the days when people went to shopping malls for the week's shopping or to purchase things for the home. They are now turning into meeting places full of people of all ages, hanging out as if they were in the town square and buying the odd thing, particularly on Sundays. Architects have achieved this success by focusing on modernity, linear forms and elegance.

One of the finest recent examples is the Campo dei Fiori Shopping Mall in the province of Varese. This is an extremely modern facility, which is well connected to local urban centres. Mapei products were used for the stone and ceramic coatings and flooring that began in October 2000 and were completed in June 2001.

#### A super-resistant screed

The client expected the need for substrates with an  $R_{ck}$  of 25 MPa in the communal areas and 15 MPa in the shops to withstand all the trolley traffic. This was obtained using MAPEFLUID PZ500\*, added to the cement in a dose of about 15%. This product drastically reduces the water/cement ratio and, thanks to its silica-fume formula, makes for a more compact screed with little shrinkage; this meant that wide spans could be used, thereby reducing the cuts in the control joints.

The first stage involved installing a layer of plastic to separate the screed from the main structure by placing polystyrene spacers along the edges and columns. The screed, measuring 7-8 cm, was strengthened with meshing, making sure the reinforcement was placed about midway through it. The choice of aggregate was also important, opting for a grain size of between 0-8 mm; in the end 5,800 m<sup>2</sup> were applied in this manner.

#### Full-contact Technology

The 20x20 porcelained gres was applied using ADESILEX P4\*, a fast-setting product with the feature of completely "backbuttering" the back of the tiles to ensure total adhesion. All by simply trowelling it on in one smooth stroke. To obtain the same result using a conventional adhesive, a "double spread" system would need to be used, also requiring the adhesive to be spread over the back of the tiles.

#### Room for Fitness

Porcelain tiles were also laid using KERAFLEX\* in the approximately 500 m<sup>2</sup> gym (in line with the latest concept of a shopping mall that has nothing to do with conventional shops). This choice was partly dictated by the ambient temperature, rising at the time due to the good weather. Bearing in mind that this setting did not require a full-contact product, it was decided to use KERAFLEX\*, whose reasonable deformability ensured it would be workable for a longer period of time.

#### The Marble Challenge

India green and Turkey silver beige chequered 1-cm thick, 30x30 "marble-module" was laid in the shopping mall's communal spaces; a total of about 1,900 m<sup>2</sup> were laid. This called for a careful analysis of the different types of marble used, since it is a well known fact that greens in particular tend





to lose their shape and clear colours often get stained. There is usually a tendency to opt for water-free adhesives in the former case (like KERALASTIC\*), whereas GRANIRAPID\* does the job nicely in the latter case.

But in this particular instance, workability problems linked with high temperatures meant it was decided to use a product that would allow more time for working without jeopardising the final result.

The two types of marble had to be tested

out in the Mapei laboratories: the instruments showed there was acceptable stability in terms of size and no danger of staining.

This meant KERABOND\* could be used mixed with ISOLASTIC\* diluted by 50% with water: this guaranteed the longest possible

times conceivable and the highest levels of deformability.

#### Sealing joints

An interesting system was also used to deal with the joints. Tiles cannot overlap with joints because this is likely to cause the tiles to crack or break off due to natural movements in the joints. This is why they were sealed using EPORIP\*: this epoxy resin, poured into the joint "seals" it, which then is recreated near the tile multiple.

In another area a wall coating has been made using tiles laid on plaster covering a total surface area of 700 m<sup>2</sup>.

ADESILEX P22\* was chosen for these operations, since this ready-to-use paste allows bonding to plaster not previously treated with a primer.

#### Easy solutions

The technology used for the locker rooms was also extremely interesting: the floors were actually waterproofed with one single 2-mm layer of MAPELASTIC\*, a two-component cementitious mortar for waterproofing balconies and swimming pools, with a fibreglass mesh inserted in it.



*Above and opposite, some pictures of the finished premises. Left and bottom, four different steps in the laying of tiles with ADESILEX P4. In particular, the centre photo shows how the back of the tile, just resting on the adhesive, is completely soaked by the product.*







*"The products referred to in this article belong to the "Products for Ceramics and Stone Materials", "Building Speciality" and "Admixtures for Concrete" ranges. The technical data sheets are available on the CD entitled "Mapei Global Infonet" and at the Internet site: [www.mapei.com](http://www.mapei.com). The Mapei adhesives and grouts conform to EN 12004 and EN 13888 standards.*



***Adesilex P22 (DITE):** ready-to-use superadhesive paste, with extended open time and resistant to slip, for ceramic tiles (for thicknesses up to 5 mm)*

***Adesilex P4 (C2F):** Fast setting full-contact adhesive for ceramic tiles*

***Eporip:** two-component epoxy adhesive for bonding new and old concrete and for the monolithic sealing of cracks in screeds*

***Granirapid (C2F):** Fast setting and hydrating two-component adhesive system for ceramics natural stone and agglomerates (for thicknesses up to 10 mm)*

***Isolastic:** flexible latex additive to be mixed with Kerabond and Kerafloor (for thicknesses respectively up to 5 and 15 mm)*

***Kerabond (C1 turns into C2 if mixed with Isolastic):** cement-based powder adhesive for ceramic tiles (for thicknesses up to 5 mm)*

***Keracolor GG (CG2):** cement-based mortar for grouting joints between 4-15 mm*

***Keraflex (C2TE):** cementitious adhesive with high adhesion strength extended open time and resistant to slip for ceramic tiles and stone materials*

***Keralastic (R2):** two-component polyurethane adhesive for ceramic tiles and stone materials*

***Mapefluid PZ500:** superplasticiser with pozzolanic effect for high quality and chemically resistant mortar and concrete*

***Mapelastic:** two-component flexible cementitious mortar for waterproofing swimming pools and balconies*

## TECHNICAL DATA

**Campo dei Fiori Shopping Mall, Gavirate (Varese) - Italy**

**Project:** paving and coating operations

**Built in:** October 2000-June 2001

**Built by:** Centro Ceramiche Pagnoncelli, Capriate S.G. (Bergamo)

**Materials used:** 20x20 porcelain tiles over 5,800 m<sup>2</sup> plus 500 m<sup>2</sup> in the gym, 30x30x1 marble-module over 1,900 m<sup>2</sup> in communal premises, tiles laid on plaster over a total surface area of 700 m<sup>2</sup> and 60x60 Logos di Bisazza agglomerate marble in a shop in the mall.

**Mapei products:** MAPEFLUID PZ 500, ADESILEX P4, KERAFLEX, KERABOND + ISOLASTIC, EPORIP, ADESILEX P22,

MAPELASTIC, KERACOLOR GG, KERALSTIC and GRANIRPID

**Mapei retailer:** Centro Commerciale Pagnoncelli, Capriate S.G. (Bergamo)

**Mapei coordinator:** Andrea Peli

This project won a prize in the Ceramics Category of the "1° Grand Prix Reference Mapei 2002". We would like to congratulate all those who took part in its design and thank those who supplied the information.

The tiles were then bonded with KERAFLEX\*, a cement-based adhesive with high adhesion strength, extended open time and no vertical slip, ideal for ceramic tiles and stone materials. This system is easy to use and can be carried out by any tile-fitter. The joints were grouted with large-grain KERACOLOR GG\*, designed for joints from 4-15 mm.

The "marble-module" was also fitted on metal supports in the lifts using KERALASTIC\*. This polyurethane adhesive is the best way of combining such different materials as metal and stone. White GRANIRAPID\* was used in one of the shops in the mall to bond 60x60 Logos di Bisazza agglomerate. In this case, GRANIRAPID\*, designed for both natural and agglomerate marbles, guaranteed a perfect result. Mapei products, used as the manufacturers suggested, enabled these designs to be made.





# Mape-Anti



The products in the Mape-Antique range and in the new Poromap range are aimed at the restoration of old or recent masonry work, subject to deterioration caused by capillary-action rising damp and unpleasant saline efflorescence stains.

*Mape-Antique range - Ready-mixed dehumidifying mortars for masonry buildings.*

They are part of the Mape-Antique range of mortars and binders for dehumidifying operations to be carried out even on buildings of historical interest, thanks to the total absence of cement.

#### Properties

- high capacity of promoting the evaporation of water absorbed by the masonry;
- high resistance to the aggressive chemical action of sulphates and chlorides;
- physically and mechanically compatible with existing materials;
- either light grey or brick in

- colour, may even be left on view;
- if required, pale-coloured pigments may be added (in MAPE-ANTIQUÉ MC or in MAPE-ANTIQUÉ LC, for example, which are light grey);
- easily applied by hand, even by non-skilled operators (applied with a trowel).

#### The products

**MAPE-ANTIQUÉ RINZAFFO** is a ready-mixed mortar in powder form. It is particularly recommended to improve the adhesion properties of the successive dehumidifying mortar on difficult substrates.

**MAPE-ANTIQUÉ MC** is a ready-to-use mortar. Blended with water, it forms a mortar which offers a good barrier against rain water while being very permeable to vapour, in order to progressively remove the damp which rises from the foundations.

**MAPE-ANTIQUÉ CC** is a prepacked brick-coloured mortar, with similar characteristics to MAPE-ANTIQUÉ MC, which is a lighter colour.

**MAPE-ANTIQUÉ LC** is a special hydraulic binder with fine mineral charges, to be mixed with sand available locally on site. It has the same properties and is the same colour as MAPE-ANTIQUÉ MC.

**MAPE-ANTIQUÉ FC** is a fine-grained light-coloured smoothing mortar which, when blended with water, gives a mix which has a plastic consistency and is easy to apply.

**MAPE-ANTIQUÉ FC/R** has the same characteristics as MAPE-ANTIQUÉ FC but is brick in colour.

#### Where to use

The MAPE-ANTIQUÉ MC and MAPE-ANTIQUÉ CC prepacked mortars and the MAPE-ANTIQUÉ LC mortar to be blended with on-site sand and hydraulic binder (as well as the ready-mixed mortar in the Poromap range – see next page) may be used as follows:

- as internal and external mortar for the repair of the bases of buildings which show signs of rising damp;
- as a dehumidifying mortar in well-aired basements which are subject to capillary-action rising damp only (only to be used for the repair of internal dividing walls);
- as a dehumidifying mortar together with other techniques, such as cutting of the wall or with a chemical barrier of silicone micro-emulsion (MAPESTOP);
- as a preventive dehumidifying treatment for masonry structures;
- as decorative mortar for masonry or stone structures;
- as decorative render or mortar bed for masonry containing soluble salts;
- as render for general use on weak substrates.

#### Finishes for Mape-Antique

It is fundamental that the finishes have high vapour-permeability properties. This is why we recommend products from the Silexcolor range, which guarantee:

- perfect adherence to the substrate;

**Mape-Antique**



**Finishes for Mape-Antique**





# que & Poromap

- high vapour-permeability properties;
- an increase in the capacity of the substrate to repel rain water;
- resistance to the peeling effect caused by acid rain;
- an enormous variety of aesthetic and decorative effects available by matching product and colour.

The Silexcolor range of finishes includes: SILEXCOLOR PAINT with a smooth finish, SILEXCOLOR TONACHINO (with a rustic finish), SILEXCOLOR MARMORINO (which gives the substrate an elegant antique finish, typical of marble) and SILEXCOLOR PRIMER, a transparent potassium silicate-based primer.

*Poromap range - Ready-mixed dehumidifying mortars for recent masonry constructions.*

The products which make up the **Poromap** range, which have only just been released on the market, are recommended for the restoration of masonry buildings where operations with cement products are permitted.

#### Properties

- high capacity of promoting the evaporation of rising water from the masonry thanks to its high porosity (>25%);
- high resistance to the aggressive chemical action of soluble salts;
- low density material which

means a lower consumption rate of render;

- improvement of indoor thermal conditions thanks to its low density;
- physical and mechanical properties as recommended by WTA;
- because of its special composition, it may be applied by spraying.

#### The products

**POROMAP RINZAFFO** is a prepacked mortar in powder form made up of sulphate-resistant hydraulic binders, special additives and suitably-graded natural aggregates. It is recommended for improving the adhesion properties of the successive dehumidifying render and to avoid the transfer of soluble salts into the render. Always use it before applying POROMAP INTONACO render.

**POROMAP INTONACO** is a prepacked mortar, made up of a sulphate-resistant hydraulic binder, pozzolanic materials, special additives and suitably-graded lightweight, natural aggregates. After setting, the render is very permeable to vapour and, therefore, leads to the removal of the damp which rises from the foundations.

#### Finishes for Poromap

The solutions recommended for this cycle foresees the use of finishes from the Silancolor range, characterised by:

- very good bond to all types of traditional renders, dehumidifiers and old paint finishes, if they are in good condition;
- high vapour-permeability properties;
- very good resistance to alkalis, U.V. rays and ageing;

- attractive smooth, opaque finish and velvety to the touch;
- resistance to the peeling effect caused by acid rain;
- a wide variety of finishes and colours available with the Colormap automatic colouring system.

The Silancolor range of finishes includes a series of products: smooth finishes such as SILANCOLOR PAINT and variable-grade fillers such as SILANCOLOR TONACHINO, to be used with SILANCOLOR PRIMER, a special transparent, potassium silicate-based primer.

#### Transparent finishes for Poromap and Mape-Antique

If you would rather leave the render or smoothing compound on view with its original colour, the colouring material may be replaced by ANTIPLUVIOL S impregnator. It is a siloxane-based water repellent material which does not alter the appearance of Poromap and Mape-Antique dehumidifiers, while giving them the highest level of protection to

*The products mentioned in this article belong to the "Building Line" range.*

*The technical data sheets are contained in the "Mapei Global Infonet" CD, and at the [www.mapei.com](http://www.mapei.com) website.*





# OPUS



1

An original monumental sculpture designed to commemorate an old furnace.

A sculpture over five metres high with a diameter of two metres and weighing over five tons, designed entirely out of "old" materials like clay, bronze and Corten steel and whose forms and colours call to mind the red-brick chimneys of old furnaces. This is the first thing that strikes you when looking at Opus, the sculpture the Osimo (Ancona) Town Council commissioned Franco Torciani to embellish the housing estate that rose up from the "ashes" of old Fagioli furnace. It took the artist almost two years to make the sculpture using three different materials: Corten steel for the structure, a typical industrial material that never wears out but oxidises in the air to turn brown; then clay was used for the coating, actually hand-made applying the same technique used for brick-making in centuries gone-by; finally, bronze was used for the inserts, fused like lost-wax and then given a copper green coating. The main problem that needed to be tackled was how to attach the terracotta parts that needed to be fixed at their narrowest bits and, most significantly, be placed on top of each other without any grouts or fillings between them. Torciani's project involved assembling the bricks into what looks like a disjointed pile rising up into the sky.

Photo 1. After setting the bricks in place, they were gradually glued to the panels using grey-coloured KERALASTIC.

Photo 2. Franco Torciani (left) was personally involved in attaching the bricks to the structure.

Photo 3. ANTIPLUVIOL 5 was first applied to the bricks while they were on the ground, during assembly operations.

Photo 4. Assembly of one of the two top sections of the structure.

Photo 5. A panel was mounted right where the sculpture will stand. The part deliberately left hollow will be covered with bricks after all the panels have been set in place.

Photo 6. The joints were sealed with black-coloured MAPESIL AC on one part and covered with KERALASTIC on the other.

Photo 7. Opus as it looks after completing the assembly operations.



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These elements had to be attached to the vibrated concrete panels with an approximately 3 cm Corten steel frame round the edges. This meant a product had to be found that adhered perfectly to the concrete and steel frame, maintained a certain structural flexibility, and was hard-wearing. In addition to the two inside walls, each composed of four panels and covering an overall surface area of about 8 m<sup>2</sup>, two three-dimensional objects to be placed on top of the sculpture also had to be coated with bricks. These objects were also made of concrete with Corten steel ribbing. The bricks were attached using grey-coloured KERALASTIC\*, a two-component polyurethane adhesive, and placed as close together as possible. The adhesive was spread over the surface of the panels and side of the bricks almost right to the top, so as to make the structure as waterproof as possible. This operation was carried out on a flat floor to make work easier; the only exception were the bricks near the overlap joints between one panel and another, which were attached after the sculpture had been assembled. Near these joints, KERALASTIC\* was only placed on the edge of the top panel, preferring to use MAPESIL AC\* for





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the lower panel, a mildew-resistant silicone sealant capable of compensating for expansion and preventing the material from breaking. After completing the attachment and assembly operations, the terracotta elements were treated with the transparent water-repellent compound ANTIPLUVIOL S\*, until they were completely saturated to reduce the risk of rain seeping in. This product had already been applied to the bricks when they were on the ground during assembly operations. Lastly, KERALASTIC\* was also spread over the upper parts not visible from the ground, again to prevent any dangerous infiltrations.

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\* The products referred to in this article belong to the "Building Products" and "Products for Ceramic Tiles and Stone Materials" ranges. The technical data sheets are available on the CD entitled "Mapei Global Infonet" and at the Internet site: [www.mapei.com](http://www.mapei.com).



The Mapei adhesives and grouts conform to EN 12004 and EN 13888 standards. **Antipluviol S:** transparent siloxane resin-based water-repellent compound.

**Keralastic (R2):** Two-component polyurethane adhesive for ceramic tiles and stone materials.

**Mapesil AC:** Solvent-free, acetic-crosslinking mildew-resistant silicone sealant. Available in 26 colours and transparent.

#### TECHNICAL DATA

Opus, monumental sculpture in Osimo (Ancona) - Italy

Built: 2002

Client: Osimo Town Council (Ancona)

Designer and works manager: Franco Torciani

Mapei products: KERALASTIC, MAPESIL AC, ANTIPLUVIOL S

Mapei coordinator: Giorgio Roncan

This project received a special mention in the Curiosities section of the "1° Grand Prix Reference Mapei 2002" competition.

We would like to congratulate all those who took part in its design and construction, and thank the people who provided us with all the relative information.



# Once-upon-a-time in Liverpool

The conversion of this old match-manufacturing factory in the industrial suburbs of Liverpool into a business centre is something of a fairy tale. The building was built in 1919 to a design by engineer Sven Bylander and the architects Mewes and Davis. It was purchased by Bryant & May in 1923 to make matches from wood imported all the way from Canada. Due to the potential hazards associated with the material being manufactured, a huge water tower holding 125 thousand litres of water was built on the roof. The building's most notable architectural feature was the absence of beams supporting the floors and roof. The building holds a unique position in British architecture as the first to have a flat slab concrete floor. After being closed in 1994, the building was left to rot. The roof eventually collapsed leaving it open to the elements and causing considerable damage to the reinforced concrete frame. After years of decay, a leading building development company, Urban Splash, came to the rescue. The company engaged the services of the award-winning architects at Shed KM and concrete repair specialists at Clan Contracting Limited to help convert the building.

## Repairs

An initial survey of the structures showed that the external concrete columns and beams would require extensive repairs. Urban Splash and Clan decided together with the Mapei Technical Department upon a schedule of repairs to the main structure based on the use of products from the Mapei grout

the matchworks

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application of MAPEFINISH\*, a two-component cementitious mortar for finishing concrete surfaces. The smooth surface resulting from this application was then given a protective coating of ELASTOCOLOR\*, protective and decorative elastic paint for concrete based on acrylic resins in water dispersion. This protective paint allowed the facade to be restored to its original colour.

Photo 1. Front of the old match factory, note a business and services centre. The water tower up on the roof.



Photo 2. The state of disrepair called for major repairs to the concrete columns and beams.

**Building the Mezzanine**  
Behind the art-deco facade with its acres of glass window there was one big open

Photos 3 and 4. MAPEFER was applied to all the columns and beams.



Photo 5. The structure of this column was reinstated with MAPEGROUT after repairing the steel.



Photo 6. The MAPEFINISH cementitious mortar used for smoothing the surface of the front.

Photo 7. Detail of a column after receiving a final protective coating of ELASTOCOLOR.

range. After removing all damaged parts, the whole building was blast cleaned to remove existing finishes and prepare the steel reinforcement for repair work with MAPEFER\*, a cementitious anti-rust mortar made of a mixture of polymers in water dispersion, cement binders and corrosion inhibitors. The structural concrete, where parts had been removed, was reinstated using mortars like MAPEGROUT THIXOTROPIC\*, MAPEGROUT FAST-SET\* and MAPEGROUT HI-FLOW\*. The surface of the entire facade was given an

space with a single floor slab supported by 128 massive concrete columns. These huge columns now support a new mezzanine floor dividing the original ground floor area in two horizontally. Before the new floor could be installed, the columns had to be repaired at the various points where they had corroded. MAPEGROUT THIXOTROPIC\*, a fibre-reinforced grout, was used to repair the concrete. A coat of MAPEFINISH\* was then applied. To create the suspended steel mezzanine floor, each of the columns had to be carefully diamond drilled to let a 75 mm solid steel pin be grouted into position using MAPEFILL\* shrink-free anchoring grout. The new floor beams were then fixed to these pins between the columns and then the floor was suspended from the new main beams. This creates a striking overall effect: the new floor appears to be floating between the columns. The inside finish is distinctly minimalistic, with steel







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girders and bare concrete ceilings reflecting the essentially industrial nature of the original structure.

#### Repairing the Decorative Tiles

Mapei supplied specially pigmented paint to match the original colour to decorate the top of the external columns. There are panels of glass ceramic tiles between the columns, over the windows, many of which were cracked, broken or even missing. Clan Contracting Ltd. commissioned tiles from Italy to replace those missing and secured them using



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Photo 8. The huge concrete columns fitted with steel pins to support the mezzanine beams.

Photo 9. Completion work on the building front.

Photo 10. A detail of the front: the missing or cracked tiles have been replaced, while the decorations at the top of the columns have been treated with a special pigmented paint.

Photo 11. One of the branches of the complex as work draws to a close.

Photo 12. The rear of the building at the end of the project.

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Mapei adhesives and grouts. The front of the old building has now been perfectly restored to its original state. The only addition are metal pods at the rear of the building designed to protect the heating and ventilation plants, the toilets and the kitchen facilities serving the various office units.

#### A Developing Area

The building is located near Liverpool's rapidly expanding airport in an area undergoing gradual redevelopment. A number of exciting new projects are under way in the area: the original Speke Airport building has been dramatically redeveloped into a new luxury hotel complex, the aircraft hangars have been revamped into a fitness centre together with tennis and badminton courts, a gymnasium and Olympic-size swimming pool.

From the road, the Bryant & May building still looks the way it did in its heyday and is once again a major landmark on the city skyline. You cannot help but notice it as you look down from above when taking off or landing at nearby Liverpool Airport.



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## TECHNICAL DATA

**Former Bryant & May Match Factory - Speke (Liverpool), England**

**Project:** renovation and redevelopment of the factory and its interiors, construction of a mezzanine floor

**Built:** 1919

**Redeveloped:** 2000-2001

**Works Management:** Urban Splash

**Architects:** Shed KM

**Structural Engineer:** Roy Billington Associates

**Sub-Contractors:**

- concrete repairs: Clan Contracting Ltd., Liverpool
- ceramic tiling: Clan Contracting Ltd., Liverpool
- window replacement: Rea Metal Windows, Liverpool
- mezzanine floor installation: Merseyside Sip Repairs

**Mapei products used:**

- for the concrete: MAPEFER, MAPEGROUT THIXOTROPIC, MAPEGROUT FAST-SET, MAPEGROUT HI-FLOW, MAPEFINISH, ELASTOCOLOR
- for the installation of the floor support bearings: EPOJET and MAPEFILL
- for the ceramic tile repairs: GRANIRAPID and ULTRACOLOR

**Mapei Retailer:** Clan Contracting Ltd., Liverpool

**Mapei Technical Consultant:** John Bradley, Mapei UK Area Sales Manager

\* The products referred to in this article belong to the "Building Products" and "Products for Ceramics and Stone Materials" ranges. The technical data sheets are available on the CD entitled "Mapei Global Infonet" and at the Internet site: [www.mapei.com](http://www.mapei.com). The Mapei adhesives and grouts conform to EN 12004 and EN 13888 standards.

**Mafer:** two-component corrosion-inhibiting cementitious mortar for reinforcing rods

**Mapegrout Thixotropic:** shrinkage-compensated fibre-reinforced mortar for concrete repair

**Mapegrout Fast-Set:** shrinkage-compensated fibre-reinforced mortar, with rapid setting and hardening for the repair of concrete

**Mapegrout Hi-Flow:** shrinkage-compensated fibre-reinforced grout for concrete repair

**Mapecolor:** two-component cementitious mortar for finishing concrete surfaces

**Elastocolor:** protective and decorative elastic paint for concrete and renders based on acrylic resins in water dispersion.

**Epojet:** superfluid epoxy resin for injection

**Mapefill:** high-flow shrink-free grout for anchoring

**Granirapid (C2F):** two-component fast setting and drying adhesive system for ceramic tiles, natural stones and agglomerates (adhesive thickness up to 10 mm)

**Ultracolor (CG2):** rapid setting and drying grout for joints 2-20 mm, available in 26 colours; does not produce efflorescence





# On the Wings of the Golden Angel



**T**he Golden Angel shines like a lighthouse in the late Prague afternoon. The brand new offices with their modern, practical furnishing can be glimpsed from the road behind the glass windows on the top floors. World famous brand names in the shop windows below are lit up during the day to catch the attention of passers-by. This is a new business and administration centre built in Prague between 1999-2001, a prestigious multi-purpose facility designed with the help of Mapei products. The exact use of the premises was not known at the time of their construction: the entire building was actually designed for the tenants eventually renting out the premises. The works mainly concerned the utilities and

floors. Ceramics were used over 1,200 m<sup>2</sup> (bathroom floors and walls and corridors) owing to the multi-functional nature of the entire complex. The synthetic resin-based primer, PRIMER G\*, and the adhesive with no vertical slip and high bonding strength, ADESILEX P9, were used for all the tiling operations. ULTRACOLOR\*, a fast setting and drying grout that does not produce efflorescence, was used for the grouting. Special attention was paid to installing an extra 350 m<sup>2</sup> of sound insulation to meet the designers' and investors' specifications. Mapei helped out with its own MAPEFONIC SYSTEM\*, a full sound-insulation system notably reducing noise from treading on the surface or bumps and bangs, even when





1 applied in minimal thicknesses. 23,000 m<sup>2</sup> of substrata were also prepared ready to be covered by the chosen finishes: most notably the special fast drying hydraulic binder TOPCEM\* and then the fast setting, self levelling smoothing compound PLANO 3\*. Even the small iron substrata of the periphery walls were smoothed and levelled off using a cement-based compound. NIVORAPID\* (ultra-fast setting mortar, also used for vertical surfaces) mixed with an elasticising additive, LATEX PLUS\*. The project was finished right on schedule, thanks to Mapei's ultra-fast products. The Golden Angel is one of the most prestigious buildings in Prague; Mapei's involvement in the works ensures it will also take part in future major building programmes in the nation's capital.



Photo 1. The Golden Angel lit up.

Photo 2 and 3. Interiors: pictures of the sanitary facilities and a floor of the business centre soon after its completion.

\* The products referred to in this article belong to the "Building Products" and "Products for Ceramics and Stone Materials" ranges. The technical data sheets are available on the CD entitled "Mapei Global Infonet" and at the Internet site: [www.mapei.com](http://www.mapei.com).



The Mapei adhesives and grouts conform to EN 12004 and EN 13888 standards.

**Primer G:** a synthetic-based water-dispersion primer

**Adesilex P9 (C2TE):** cement-based adhesive with high bonding strength and no vertical slip used for ceramic tiles

**Ultracolor (CG2):** a fast setting and drying grout for grouts measuring 2-20 mm, available in 26 colours; does not produce efflorescence

**Mapefonic System:** rapid sound-insulation system notably reducing noise from treading on the surface or bumps and bangs, for tiled and stone floors

**Topcem:** special normal setting rapid drying hydraulic binder (7 days)

**Plano 3:** fast setting, self levelling smoothing compound

**Nivorapid:** ultra-fast setting thixotropic cementitious levelling mortar, suitable for vertical surfaces

**Latex Plus:** elasticising additive for mixing with Keraquick for increased deformability, and with Nivorapid for improved deformability and improved adhesion to tricky surfaces

## TECHNICAL DATA

**Golden Angel** (business and administration centre), Prague-Smíchov, Czech Republic  
**Works:** soundproofing and laying of wall and floor coatings.

**Built:** 1999/2001

**Commissioned by:** Ing. Real Estate

**Architects:** AJN Architectures Jean Nouvel

**Main Contractor:** PSJ Holding Jihlava

**Works Management:** Atelier 8000 Sro. - Ladislav Král

**Builders:** SPO Sro. Plzen

**Mapei products:** PRIMER G, ADESILEX P9, ULTRACOLOR, MAPEFONIC SYSTEM, TOPCEM, PLANO 3, NIVORAPID + LATEX PLUS

**Mapei Technical Consultant:** Radek Netolicka, Mapei Sro.




The innovation  
that changes the installation  
of tiles and marble

# Mapei Planobond and Adesilex P4 full contact adhesives

NO BACK-BUTTERING • NO BEATING  
100% COVERAGE • SAVE TIME & MONEY

**DROP  
and  
GO!**

 **MAPEI**

 **MAPEI**

ADHESIVES • SEALANTS • CHEMICAL  
PRODUCTS FOR BUILDING  
[www.mapei.com](http://www.mapei.com)







# FULL-CONTACT ADHESIVES

Lay floors without back-buttering, to save time and money!

*Issued by the Technical Assistance Department*

Amongst the various solutions offered in Mapei's range of adhesives, the full-contact type are an ideal choice for a wide range of floor-laying problems. ADESILEX P4 and PLANOBOND are high performance, one component, cementitious adhesives (class C2 according to EN 12004 standards). They are suitable for indoor and outdoor flooring, for laying all types of ceramic tiles, even the larger sizes, stone slabs (if they are stable to humidity and are free of efflorescence), Tuscany clay tiles and terrazzo. They also offer a secure bonding in environments subject to heavy traffic. The difference between the two products is their pot life, setting time, final adjustment time and ready for service time. ADESILEX P4 is a quick-setting adhesive and is classified as "F" (fast setting) according to EN 12004 standards. PLANOBOND, on the other hand, is classified as "E" according to EN 12004 standards, that is, with extended open time. The term "Full-contact" is the characteristic of the adhesive to be transferred onto the whole of the back face of the tile or slab without excessive beating down or final adjustment. This property avoids the formation of potentially harmful gaps or voids in the layer of adhesive, which could create weak spots in the floor when under normal use. If the adhesive is not distributed uniformly on the back of the tile,

concentrated stress points may be created due to the loads applied, which could lead to the breakage of the tiles. Also, with outdoor flooring, the presence of gaps provides potential accumulation points of water which, because of the thermal alterations at around 0°C, may determine the formation of stresses. These may cause a deterioration of the adhesive which could lead to the tile becoming unstuck. The full-contact effect is normally achieved, especially on tiles larger than 30x30 cm, by "double-buttering", that is, by also spreading a layer of adhesive on the back face of the tile before laying it. This is an operation which requires more time and more labour for laying the tiles, and it is not possible to verify its contact efficiency, unless you remove the tile during the laying phase.

The use of Mapei's ADESILEX P4 and PLANOBOND full-contact adhesives means that the same results may be achieved in a notably shorter time, with a better yield and, therefore, at a lower cost.

ADESILEX P4 and PLANOBOND are in the form of grey powder which, when blended with 20-22% water, are transformed into a very soft paste. It is so easy to apply that very little effort is required by the user, yet at the same time it perfectly maintains the rut of the trowel. The tile is then positioned on the layer of adhesive which, with a light hand pressure for final positioning, levels itself out and fills the ruts left by the trowel and guarantees that the adhesive is completely transferred onto the back face of the tile. This means that the floor is perfectly flat with an optimum distribution of the loads.

We must bear in mind that a tile's tensile strength determined by pull off test is tightly connected to the tensile strength of the adhesive and the percentage of its distribution on the back of the material laid down.

A nominal resistance to pull equal to 1 N/mm<sup>2</sup> means that a force of 10KN is required to "unstick" a 10x10 cm tile. If the adhesive covers only 50% of the tile because it is not spread on very well, the force required to remove the same tile would be reduced to only 5 KN.

In view of the above, it is quite clear that ADESILEX P4 and PLANOBOND are the ideal solutions for a wide variety of floor-laying operations. Shopping centres, industrial floors, schools, hospitals and offices are all ideal environments for the use of full-contact adhesives, where their resistance to intense traffic and concentrated loads is a fundamental requisite.

What is more, these characteristics, together with the rapidity of ADESILEX P4, means that the flooring may be re-laid in work areas or areas open to the public, with only a limited or even no interference with normal activities, which considerably reduces economic losses.

*(More information on ADESILEX P4 and PLANOBOND is contained in the leaflet attached to this issue).*





# World Cycling Centre

## Centre Mondial du Cyclisme World Cycling Centre

The UCI has never had a facility like this. A hundred years after it was first set up (by five nations back in 1900: Italy, France, Switzerland, Belgium and the United States), the International Cycling Union has now been refurbished with a brand new headquarter, the World Cycling Centre, which officially opened last April in Aisle, Switzerland. Conceived along futuristic lines, the new centre is designed to meet three different requirements: the management of cycling (UCI), the training and development of new cyclists (cycling arena) and management training (teaching rooms).

### A Showcase for the UCI

"This project - Jean-Pierre Strelbel, the executive director of the project, noted - fits in perfectly with our policy, neatly summed up in the slogan we chose for entering the third millennium: a century heading into the future."

The facility, which was built between 2000 and early 2002, is easy to get to: it is actually just 40 kilometres from Lausanne and an hour's drive from Geneva International Airport. It is furnished with a large reception room, a museum with boldly designed glass windows, a roof shaped like a wheel covering the cycling arena, and then offices, rooms, a library, archives, restaurant, and rooms for holding seminars and permanent or regular training courses. All designed to cater for the needs of a set-up involving 171 countries and which, therefore, is in urgent need of an international showcase combining utility, functionality and visibility.

Strelbel went on to add that the "creation of the WCC near Lausanne and headquarters of the International Olympic Committee will hopefully inject fresh life into our training, development and co-operation programmes."

### The Architectural Design

"Thanks to the confidence and innovative spirit of the management team at the WCC - so the architect Pierre Grand told us - a novel, cutting-edge design was developed in the hands of a multi-disciplinary team. The project is designed around its three distinctive sections - the administration building, the sports complex including the cycling arena, and a gym for top-class athletes - serving three separate purposes.

The project is interesting for the way these three sections are juxtaposed, how they complement each other stylistically, and the methods used to build them."







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Photo 1. The inauguration of the new CMC.

Photo 2. The first works phases.

Photo 3. A view of the almost finished centre.

### The Project Philosophy

One of the Centre's key projects is to provide training facilities for the 2004 Olympic Games. Each year the Centre will host 30 athletes from developing nations on a 10-and-a-half month training scheme. The athletes will be coached by Frédéric Magné and Chantal Daucourt (for the sprinters and women cyclists respectively), carefully selected by the Lucien Bailly, who is in charge of organising the Centre's sports activities. The cycling arena is open to anybody who wants to train, including students, with special attention reserved for cyclists or aspiring cyclists. A special track starting in the hills and running down to the Centre has also been designed for mountain bikers, and a cycle path is planned to be built soon, which will also start at the Centre and run along the Rhone. A total of 50 people work at the WCC: about forty in the administration department and ten other collaborators (assistants, instructors, coaches), who are accommodated in the nearby "Mon Sejour" residential centre.

The new World Cycling Centre in Aigle may rightly be considered the jewel in the UCI's crown, a fitting gift for its hundredth anniversary, in the hope that another 100 wonderful years lie ahead. It is also sincerely to be hoped that the centre will play its part in the battle against doping.

### A Cycling Arena for Champions

The World Cycling Centre's signature feature is the cycling arena. This is an indoor arena with a 200-metre-long track, 7 metres wide and with embanked bends rising up to a height of 1.6 metres. As the architect, Mr. Grand, told us "the cycling arena's roof made of a three-dimensional structure covered with a twin membrane covers an interior space with no bearing structures." There is a grass field in the middle that can be used for playing cycle-ball or holding artistic cycling displays. All around there are locker rooms, gyms, maintenance rooms and store rooms (for track, road, mountain, trial, BMX, polo-cycling and artistic cycling bikes).

And then there are garages, offices for the federation, coaches, commissioners and judges, a medical room, clinics for carrying out medical tests, and stands. The training rooms are particularly important (a building has been allocated to the Swiss Gymnastics Federation after it received public financial backing). "Thanks to the help of the Federal Sports Department - Strebel pointed out - what was only supposed to be an international cycling project has quickly turned into a national centre for the sporting elite, and not just for cycling but also other important sports like gymnastics, athletics, fencing (mainly at international level) etc.

### Building the Centre

A number of Mapei products were used to build the Centre.

The following were used for the concrete: MAPEFLUID X404\*, a superplasticiser for concrete with low loss of workability; MAPEFLUID N100\*, a superplasticiser for concrete with a slight retarding effect, IDROSTOP\*, a hydrophilic expandable rubber section for watertight construction joints, available in two sizes, 20x10 mm and 20x15 mm, labelled IDROSTOP 10 and IDROSTOP 15, and also IDROSTOP MASTIC\*, a one-component adhesive for installing IDROSTOP\*.

Other products used for concrete include: MAPETARD\*, a plasticiser for concrete with a retarding effect; ANTIGELO S\*, a chloride-free antifreeze for cementitious mortars and concrete, and MAPECURE E\*, a curing compound





*Photo 4, 5, 6 and 7.  
The administration building, two pictures of the cycling arena and the gym.*

*Photo 8 and 9.  
Linearity and formality of the exterior walls of the administrative buildings and cycling arena.*

in water emulsion.

The following were used for protecting the concrete: WALLGARD GRAFFITI BARRIER\*, a reversible graffiti-resistant protective barrier for all surfaces, and MAPEFINISH\*, a two-component cementitious mortar for concrete surfaces. For the steel roof structure, it was decided to opt for MAPEFILL\*, a high-flow shrink-free grout for anchoring, and ADESILEX PG1\*, a thixotropic epoxy adhesive for structural bonding.

The adhesives used for laying the tiles were: GRANIRAPID (C2F)\*, a two-component adhesive system with rapid setting and hydration for fixing ceramics, natural and artificial stone (adhesive thicknesses up to 10 mm); KERAFLEX (C2TE)\*, cementitious adhesive with reasonable deformability, good adhesion strength and no vertical slip, ideal for ceramic tiles and stone materials; PLANOBOND (C2E)\*, a full contact cementitious adhesive with medium deformability, designed for indoor and outdoor ceramic floors. In addition, the following were also used: KERAPOXY (RG)\*, a two-component acid-resistant epoxy grout for joints measuring at least 3 mm, available in 26 colours, and ULTRACOLOR (CG2)\*, a rapid setting and drying grout for 2 to 20 mm joints, available in 26 colours and does not produce efflorescence.

The special floors designed by Mondo SpA were treated with: PRIMER G\*, a synthetic-resin-based water dispersion primer with a low content in volatile organic compounds (VOC); EPORIP\*, a two-component solvent-free epoxy adhesive for bonding and the monolithic sealing of cracks and screeds; NIVORAPID\*, a cementitious thixotropic levelling mortar for ultra-fast setting (4-6 hours) vertical surfaces with thicknesses ranging from 1-20 mm; PIANODUR R\*, an







6



7



8

ultra-fast setting (12-24 hours) fine grain self-levelling smoothing compound for thicknesses of up to 3 mm, ideal for floors subject to intense traffic; LIVIGUM\*, an additive in water dispersion for cementitious levelling compounds and mortars; ADESILEX G19\*, a two-component polyurethane adhesive for rubber and PVC flooring; ULTRA/BOND ECO V4SP\*, a universal adhesive in water dispersion with low emission of volatile organic compounds (VOC) for tough floors with extended open time, and, lastly, ADESILEX LP\*, a double-coat polychloroprene adhesive in solvent solution for floors with vinyl and rubber surfaces.



We would like to thank "TuttoBici" (no. 4/2002), from which part of this article and some of the photos are taken.

\* The products referred to in this article belong to the "Products for Ceramics and Stone Materials", "Products for the installation of resilient, textile and wood floor and wall coverings", "Building Products" and "Admixtures for Concrete" ranges. The technical data sheets are available on the CD entitled "Mapei Global Infonet" and at the Internet site: [www.mapei.com](http://www.mapei.com).

The Mapei adhesives and grouts conform to EN 12004 and EN 13888 standards.



TECHNICAL DATA

**World Cycling Centre, Aigle, Switzerland**  
**Built:** 2000-2002  
**General design and architectural project:** Consorzio CMC: Pierre Grand et Pascal Grand, Lausanne; Tekhne Management SA, Lausanne; SGC Surveillance et Garantie de la Construction SA, Geneva  
**Track designer:** Ralph Schürmann, Munich, Germany  
**Civil engineering:** Consorzio DDP: DIC SA, Diuneur Ingénieurs, Aigle; Dupuis & Associés, Nyon; Passera & Pedretti Consulting Engineers, Lugano  
**Building Contractors:** Consortium Aiglon, Monthey; Billieux SA; Crausaz SA; Gasser SA; Echenard SA; Cadosch SA.  
**Mapei products used:** see article  
**Mapei retailer:** Gétaz Romang SA, from Aigle  
**Mapei Consultants:** Fredy Liniger and Yves Messori



# HIGH PERFORMANCE

by P. Zaffaroni\*, C. Pistolesi\*, E. Dal Negro\*, L. Coppola\*, M. Collepardi\*\*

*A combination of chemical and mineral admixtures was studied to manufacture new High Performance Shotcretes (HPS) by wet-mix process. Superplasticized low-slump-loss concretes (slump of 210 – 220 mm) with water-cement ratios in the range of 0.42 – 0.44 were treated by wet-mix guns. Silica fume (20 Kg/m<sup>3</sup>) was used to reduce the rebound of aggregates and improve the bond to the substrate.*

*Pozzolanic or slag cements (450 Kg/m<sup>3</sup>) were used to manufacture durable concretes, although these cements do not perform as well as portland cements in attaining high early strength.*

*Traditional accelerators based on sodium silicate and new alkali-free chemical admixtures were added at the nozzle and assessed through field tests for shotcrete applications in a tunnel.*

*Alkali silicate-based accelerators (12% by cement mass) performed slightly better than alkali-free chemical admixtures (7%) in terms of very early strength at 20-60 min. However, at 4 hours and later ages compressive strength of shotcretes with the alkali-free accelerator increased much more than in the corresponding mixtures with sodium silicate. Compressive strength of cored cylinder specimens were 2-6 MPa at 4 hr, 12-15 MPa at 12 hr, 20-25 MPa at 1 day, 45-50 MPa at 7 days and 50-60 MPa at 28 days when the alkali-free accelerator was used. The compressive strength values of these HPS at 1-28 days were 5-10% less than the corresponding control concrete specimens, without accelerators, cast in forms. On the other hand, the 28-day compressive strength values of cored specimens for shotcretes treated with sodium silicate were, as usually, 50-60% less than the corresponding control concretes.*

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According to the definition of American Concrete Institute [1] shotcrete is "mortar or concrete pneumatically projected at high velocity onto a surface". These are two different types of shotcrete: dry-mix and wet-mix. In the dry-mix procedure all ingredients except the water are mixed, and then the dry mixture is blown through the delivery hose in a stream of compressed air to the nozzle, where the water is added. In the wet-mix procedure, all ingredients including the water are combined in the mixer, and the resulting wet mixture is propelled to the nozzle where a blast of compressed air impels it on to the receiving surface [2].

Due to the difference in the water requirements between these two processes, the water-cement ratio (w/c) of the wet-mix shotcrete is in general higher than that of its corresponding dry-mix composition. This results in greater porosity, permeability, drying-shrinkage, lower strength, and durability of the wet-mix shotcrete with respect to that of properly applied dry-mix composition [2].

More recently, due to the combined use of superplasticizer and silica fume, wet-mix shotcretes have been developed with superior adhesive quality which makes them well suited for repair and rehabilitation of concrete structures by the wet-mix shotcreting process [3]. Morgan [4] has reviewed new developments in shotcreting with several examples of shotcrete repair of infrastructures in North America. However, when for some reasons accelerating admixtures are used, the performance in service, in terms of compressive strength, is significantly reduced (by 50-60%) with respect to the control mixture without accelerator. Moreover, the traditional accelerators based on sodium silicate, aluminate and carbonate increase the causticity risk for the workers during the application of the shotcrete.

The purpose of the present work was to study the combined action of superplasticizer, silica fume, accelerator, and blended pozzolanic or slag-portland cement to produce high-performance shotcrete (HPS) by wet-mix process in terms of the following characteristics:

- low causticity risk during application
- high workability and low slump-loss
- low rebound
- high early and later strength
- high durability

## Materials

**Cements:** High-strength portland cements are in general preferred rather than blended cements for shotcrete process due to the faster cement hydration rate. Blended cements in form of pozzolanic or granulated blast furnace slag (GBFS) cements were used in the present work for their better performance in service in terms of higher durability, lower heat of hydration, and lower vulnerability to cracking from thermal, autogeneous,



# SHOTCRETE



and drying shrinkage stresses [3]. Pozzolanic cement (CEM IV/A 42,5 R according to the European Norm EN 197/1) with 35% of fly ash replacing portland cement was used. Granulated blast furnace slag cement (CEM III/A 42.5 according to the European EN 197/1) with 50% slag replacing portland cement was also used.

**Silica fume:** Densified silica fume was used to improve the bond to the substrate and reduce the rebound of aggregates. Table 1 shows the chemical composition of silica fume.

**Superplasticizer:** A commercial 30% aqueous solution of carboxylic acrylic ester (CAE) was used as superplasticizer to manufacture fluid concretes with a slump of 210-220 mm and a water-cement ratio (w/c) as low as 0.42-0.44. More details on the chemical composition of this superplasticizer were published in previous works [5, 6].

**Accelerators:** Two different types of commercial accelerating admixtures were used. A traditional shotcrete accelerator based on sodium silicate aqueous solution (36%) and a new alkali-free shotcrete accelerator based on a water emulsion of aluminium sulfate (60%) were used. Due to the absence of alkali there is a lower risk of causticity during application when the latter is used.

**Aggregates:** Three natural limestone in

form of fine sand (0-4 mm), coarse sand (4-6 mm) and gravel (6-8 mm) were used by adopting the following percentages: 65, 30, and 5% respectively.

**Concrete mixtures:** Two basic control mixtures were manufactured, both without accelerators, the main difference being the cement type (pozzolanic cement CEM IV/A 42.5 and slag cement CEM III/A 42.5).

Table 1 shows the composition and the slump of the two fluid control mixtures before the addition of the accelerators. For each basic concrete after 30 min of mixing, one or two different types of accelerator were added at the nozzle: sodium silicate admixture or alkali-free accelerator at a dosage of 8-12% or 6-7% by cement mass respectively.

## Methods

The following measurements were carried out:

- **Slump** at 5 and 30 minutes to assess the slump-loss behavior before the addition of the accelerators.
- **Rebound** was determined, after tunnel lining operations in the absence of reinforcing, by measuring the percentage of shotcrete which ricochets off the receiving surface and falls to the ground with respect to the total amount of projected concrete.



- *Specific gravity ( $g_0$ )* of control concrete specimens (without accelerators) placed into forms and fully compacted, and specific gravity ( $g$ ) of cored specimens from shotcretes with accelerating admixtures:  $g/g_0$  indicates the compaction degree of the shotcrete with respect to the corresponding concrete without accelerator, fully compacted according to the traditional methods.
- *Proctor penetrometer test* (needle of 9 mm in diameter) on placed shotcretes (5 min-60 min) and determination of the very early compressive strength through calibration curves.
- *Piston tool Hilti method* developed by Kusterle [7] to determine the early compressive strength (2-15 MPa) of placed shotcretes (4-12 hr);
- *Compressive strength* at 1-28 days of cored shotcretes (100 mm high, 50 mm in diameter) with accelerators added at the nozzle;
- *Compressive strength* at 1-28 days of cored control concretes (100 mm high, 50 mm in diameter), without accelerators, placed and fully compacted into prismatic forms.

**Results**

Due to the use of the CAE type superplasticizer [5, 6] the slump loss within 30 min is negligible before the addition of the accelerators at the nozzle (Table 1). This means that the productivity of the shotcrete can be as high as 20 m<sup>3</sup>/hr due the workability of the pumped concrete feeding the spraying equipment in a reliable manner for the negligible slump-loss. At a given superplasticizer dosage (1.2%), the w/c is a little lower (0.42 vs. 0.44) for the concrete with slag-cement than for that with pozzolanic cement, although the initial slump was slightly higher

Table 1

**COMPOSITION AND SLUMP OF THE CONTROL MIXTURES BEFORE THE ADDITION OF THE ACCELERATORS AT THE NOZZLE**

Ingredient	Concrete P with pozzolanic cement (IV/A 42.5)	Concrete S with GBFS cement (III/A 42.5)
Cement	450 Kg/m <sup>3</sup>	450 Kg/m <sup>3</sup>
Fine sand (0-4 mm)	1075	1075
Coarse sand (4-6 mm)	495	495
Grave (6-8 mm)	82	82
Silica fume	20	20
Water	198	190
Superplasticizer (1-2% by cem.)	5.4	5.4
w/c	0.44	0.42
Slump		
5 min	210	220
30 min	200	215

Table 2

**INFLUENCE OF THE SODIUM SILICATE (NS) OR ALKALI-FREE (AF) ACCELERATOR ON THE SPECIFIC GRAVITY OF THE SHOTCRETE (g) WITH RESPECT TO THAT ( $g_0$ ) OF THE CONTROL CONCRETE WITHOUT ADMIXTURE FULLY COMPACTED**

Cement type	Accelerator (%-type)	Specific gravity, g (Kg/m <sup>3</sup> )	$g_0$ /Specific gravity, $g_0$ (Kg/m <sup>3</sup> )	$g/g_0$	Strength loss (%)	
					Expect.	Measur.
III	12-NS	2239	2384	0.94	30-36	55
III	8-NS	2247	2359	0.95	25-30	54
III	7-AF	2300	2359	0.97	15-18	10
IV	7-AF	2296	2336	0.98	10-12	8

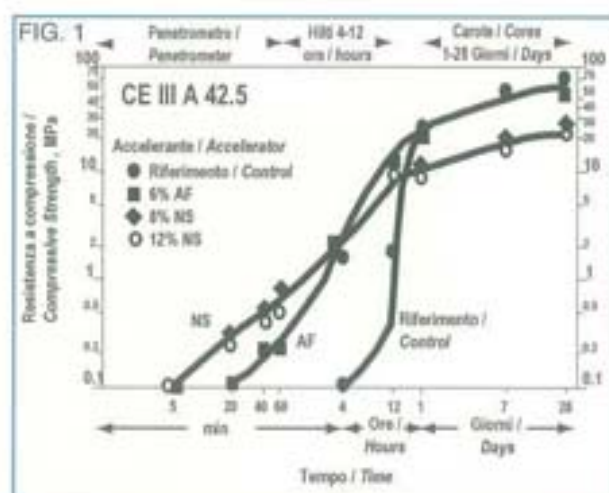


Fig. 1 - Influence of accelerators - sodium silicate (NS) or alkali-free (AF) - on the compressive strength of the shotcrete with slag cement III/A 42.5

(220 vs. 210 mm) for the former. In tunnel lining operations with no reinforcing the rebound of all shotcretes studied was as little as 2-3% due to the high cohesiveness of the mixture for the combined presence of superplasticizer, silica fume, and accelerators. Figure 1 shows in a double-logarithmic scale the concrete compressive strength, measured at 5 min to 28 days after shotcreting, on the slag-cement concrete (Table 1) manufactured without accelerator, with sodium silicate (8 and 12%), and with alkali-free accelerator 6%. The sodium silicate accelerator is a little better than the alkali-free admixture in terms of very early compressive strength: for instance at 1 hr the compressive strength is 0.5 MPa with the silicate admixture and 0.2 MPa with the alkali-free accelerator. However, at 4 hr the two accelerators perform the same, and at 23 hr and later ages the alkali-free accelerator perform much better than the silicate admixture. For instance, the 28 day compressive strength of the shotcrete with the alkali-free accelerator is as high as 60 MPa (only 10% less than the control mixture), whereas the corresponding strength loss of the shotcrete with silicate is 60% less than that of the control concrete. The excellent results of the alkali-



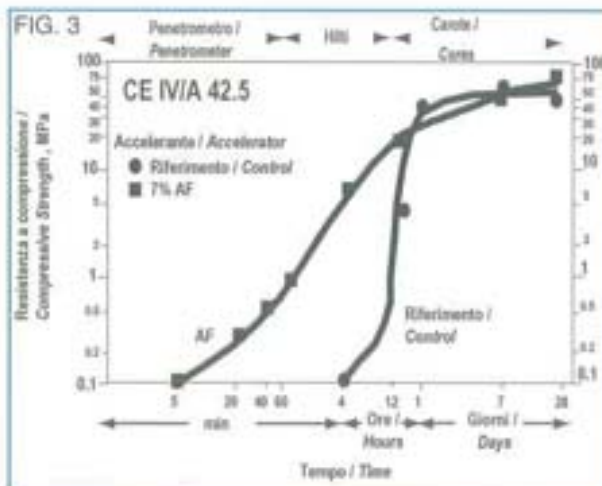
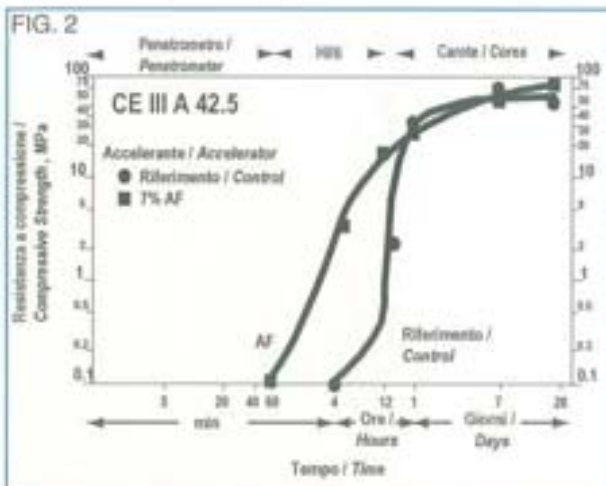


Fig. 2 - Influence of the alkali-free (AF) accelerator on the compressive strength of the shotcrete with slag cement III/A 42.5.

Fig. 3 - Influence of the alkali-free (AF) accelerator on the compressive strength of the shotcrete with pozzolanic cement IV/A 42.5.

free accelerators in terms of the strength at later ages were confirmed by using a little higher dosage of the admixture (7%) both in the slag-cement concrete (Fig. 2) and in pozzolanic-cement mixture (Fig. 3). Again, the strength loss at later ages is negligible (only 10%) with respect to the usual strength reduction caused by the traditional accelerators based on sodium silicate, aluminate or carbonate [8].

In order to explain the different role played by sodium silicate accelerators and alkali-free admixtures, the strength loss at 28 days with respect to the control mixtures were compared with the corresponding expected values on the basis of the lower compaction degree determined by the specific gravity ratio  $g/g_0$ . It is known [9] that for each 1% of lower specific gravity there is a compressive strength reduction of about 5-6% for the voids caused by the lower compaction. Therefore a compaction degree of 0.94 in terms of  $g/g_0$  in the 12% silicate shotcrete (Table 2) should correspond to an expected strength loss of 30-36%. This is much lower than that (55%) measured at 28 days on the silicate shotcrete in service with respect to the control concrete without admixture placed in forms and completely compacted. This means that, in addition to an uncomplete compaction, something else must be taken into account to explain the measured strength loss. This could be related to the lower degree of hydration caused by the sodium silicate admixture on the  $C_3S$  and  $C_2S$  hydration of the clinker phase [10].

On the other hand, in the presence of the alkali-free accelerator the degree of compaction (0.97-0.98) is higher for the better workability at the time of spraying. Moreover, the measured strength loss at 28 days is equal or a little lower with respect to the expected value (10-18%) on the basis of the lower degree of compaction. This means that alkali-free accelerators do not produce any reduction in the degree of hydration at later ages. On the contrary, the lower strength loss at 28 days with respect to the expected value based on the reduction of the compaction degree (Table 2) would indicate that this effect is partly compensated by a higher degree of hydration.

## Conclusion

The combined use of an acrylic superplasticizer, silica fume and an alkali-free accelerator allows to manufacture high performance shotcretes (HPS) in terms of high slump level, high compressive strength, good compaction, and excellent durability for the low  $w/c$  and the use of pozzolanic or slag

cements with 30 or 50% replacement of portland cement respectively. Low slump-loss, low rebound, and low causticity risk during application are other important properties of this HPS. ■

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# A Troll in Wonderland

An Italian-Norwegian artist, Ivo Caprino, decided to design one of the symbols of Norwegian culture, a Troll, right in the middle of a popular park.

Norway is famous for its magnificent landscapes, fjords, midnight sun and even Trolls, mysterious creatures that live hidden away in the woods and study humans from afar. In the 1980s somebody came up with the idea of devoting an entire park to the north of Lillehammer to Trolls, and so in summer 1985 the Hunderfossen Wonderland, as the park is known, officially opened.

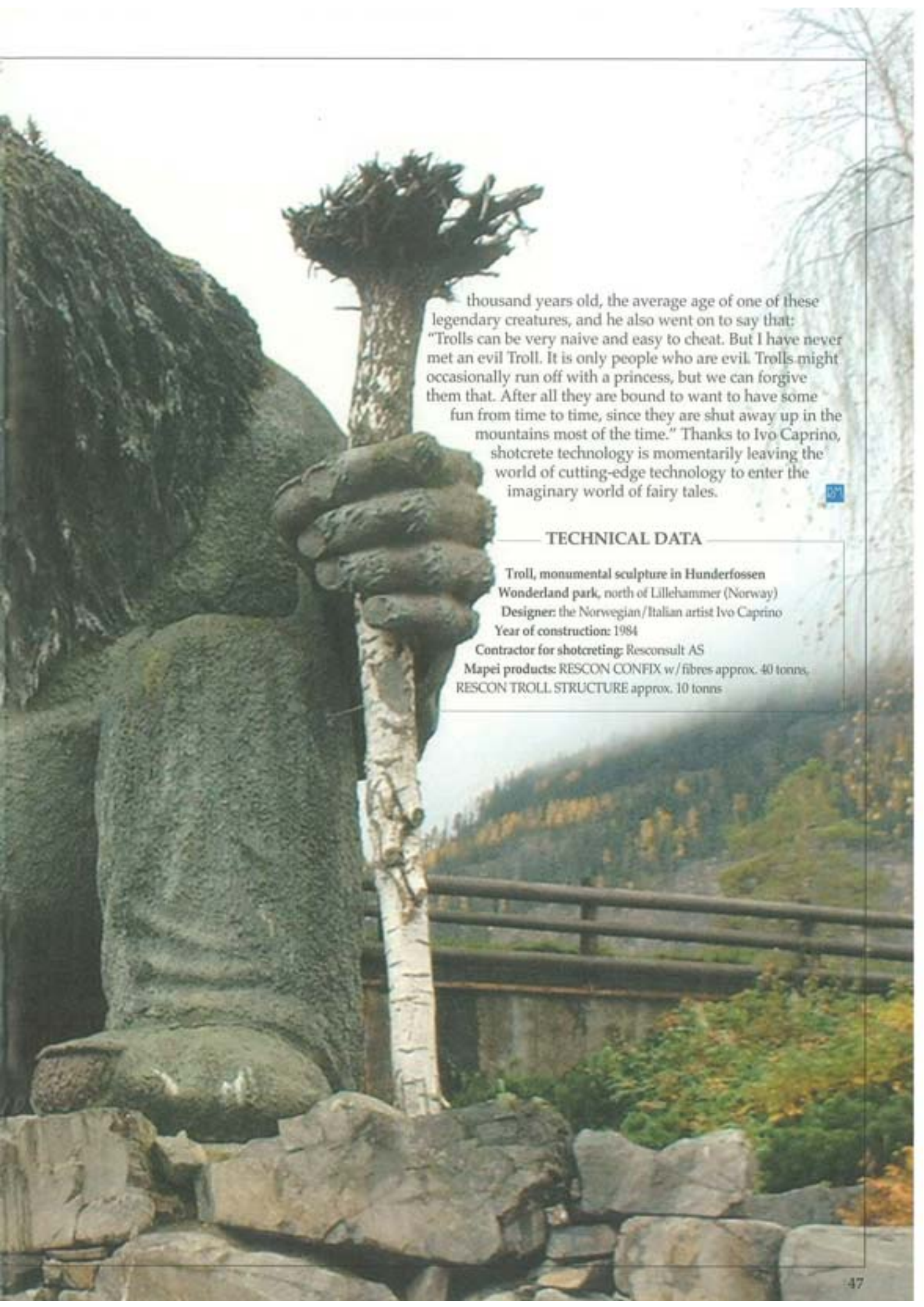
Visitors are greeted by a striking sculpture of a Troll, which is 11 metres tall, 6 metres wide and weighs over 70 tons, placed right at the entrance to a huge cave of about 6 thousand square metres. In actual fact trolls do not only live in woods, but also in caverns and gorges well away from prying eyes, and this huge cave evokes all these exciting Norwegian folk adventures. It is an exciting and intriguing experience to walk between the legs of the huge squatting Troll lost in thought, the same feelings visitors get when they catch sight of the sculpture towering up on the edge of the park. Ivo Caprino first constructed the Troll's skeleton or structure and then sprayed it with Mapei's Rescon CONFIX "enriched" with reinforced plastic and fibre. This mortar is specially designed for repairing, strengthening and maintaining concrete, whose strength, low shrinkage and density are all crucial properties. The mortar has been even further reinforced with 18 mm EE-steel fibres.

The Troll's head and hands were specially cast with glassfibre-reinforced polyester by Caprino's people at his studio in Oslo and then taken to Lillehammer, whereas the body was built on-site. CONFIX with fibre is often used for rock securing in Sweden and Norway, as well as repairing quays and bridges worn away by the salt and bad weather. The outside of the steel reinforced shotcrete (cutting-edge technology in sprayed concrete for the building trade) was sprayed with a special musk-green mortar whose very name evokes its function: TROLL STRUCTURE. A 3-5 cm layer of this easily workable mortar was applied without the addition of accelerators. In the end about 10 tons of the substance was used for the job.

Caprino claims that the Troll might well be almost one







thousand years old, the average age of one of these legendary creatures, and he also went on to say that: "Trolls can be very naive and easy to cheat. But I have never met an evil Troll. It is only people who are evil. Trolls might occasionally run off with a princess, but we can forgive them that. After all they are bound to want to have some fun from time to time, since they are shut away up in the mountains most of the time." Thanks to Ivo Caprino, shotcrete technology is momentarily leaving the world of cutting-edge technology to enter the imaginary world of fairy tales.

#### TECHNICAL DATA

Troll, monumental sculpture in Hunderfossen  
Wonderland park, north of Lillehammer (Norway)  
Designer: the Norwegian/Italian artist Ivo Caprino

Year of construction: 1984

Contractor for shotcreting: Resconsult AS

Mapei products: RESCON CONFIX w/ fibres approx. 40 tonnes,  
RESCON TROLL STRUCTURE approx. 10 tonnes



# The magic CARPET



**T**he water is there, you just cannot see it. The magic lies in the "Magic Carpet's" folds, a fountain that looks just like a fancy carpet lying across marble steps. The water flows like a veil along the folds in this artistic creation designed for the English city of Hove in the heart of East Sussex.

The fountain is situated right in the middle of the front courtyard of the Chatsworth Court Estate. The project was designed and personally created by the architects Jane Fordham and David Parfitt in 2001, using Mapei products to actually construct it.

The "carpet" rests on four marble covered steps and is folded to create a soft-looking effect. It was actually constructed using Thermalite Blocks, onto which the steel frame structure was then placed. POROCOL was used at this stage in the work, a cementitious powdered adhesive mortar for expansive block masonry.

To complete the work, which initially measured 120x240x80 cm, a 5 mm Bisazza glass mosaic was laid using KERALASTIC, a two-component polyurethane adhesive for ceramic tiles and stone materials. The finished fountain covers an area of approximately 12 square metres.







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# NEW FIGURES FOR THE MAPEI GROUP 2003

# 39

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Euros

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more than

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