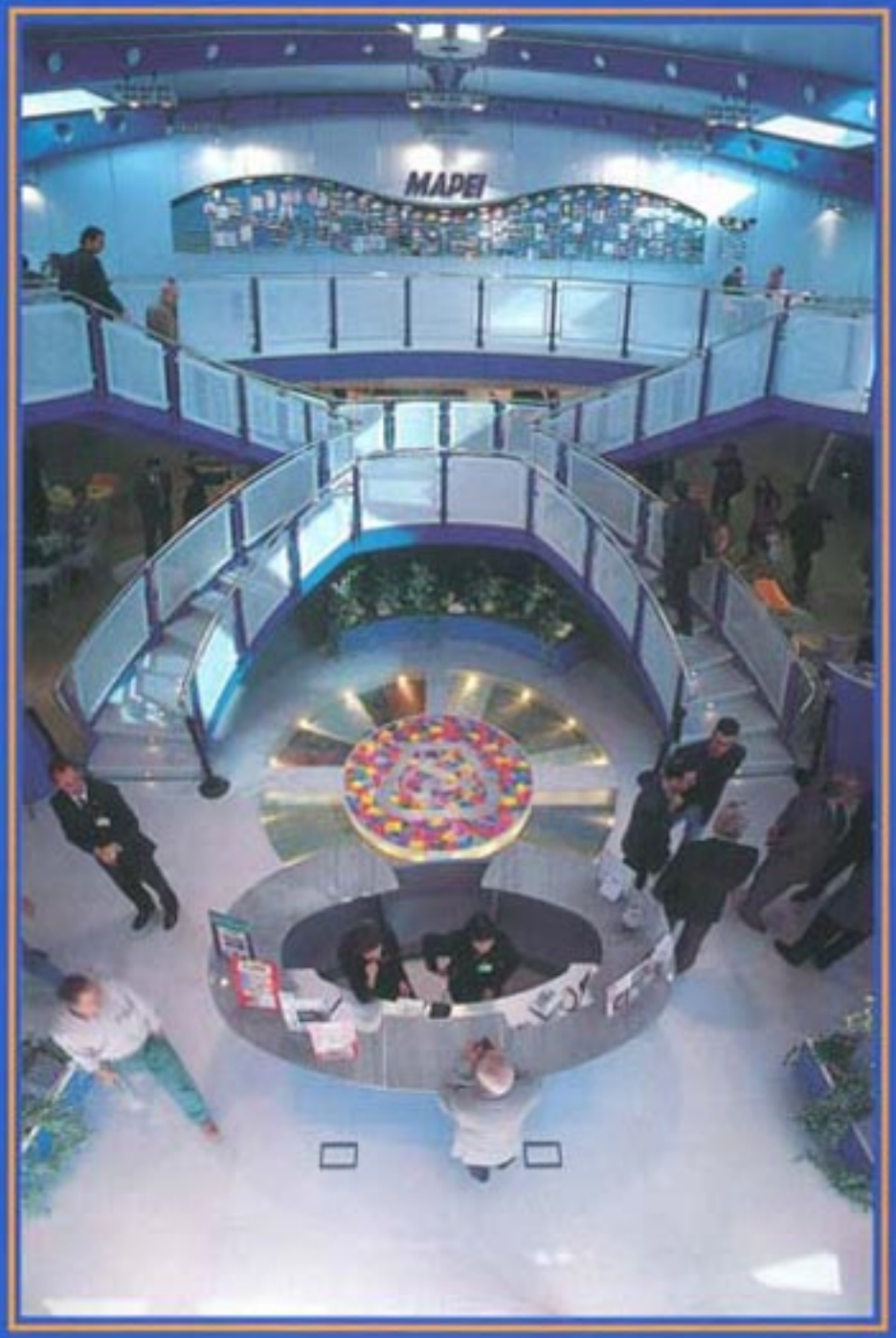
INTERNATIONAL

REALTÁ MAPEI



Mapei's new home

Mapei in Australia

The Sydney Olympics

Shedding new light on the ancient city of Jericho

Météor

Mapei Quick-Step 2001

9

In this issue of Realtà Mapei, you will find the 2001 calendar of races of this year's cycling season in which the Mapei-Quick Step team will participate. Follow our team during this season! The new team is presented on page 66 Enjoy ... Mapei-Quick Step.

REALTÁ MAPEI

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Main cover photo: *Mapei's new two-level Stand present at the las Cersaie fair in Bologna (article on page 57)*

TEAMWORK

NEWS

PROJECTS

PRODUCT SPOTLIGHT

CONCRETE TECHNOLOGY

TRADE FAIRS

EXPERT OPINION

DISTRIBUTION

MAPEI SPORTS DIVISION

Mapei in AUSTRALIA

A 30,000-ton of products a year Mapei manufacturing plant, the Group's 26th to date, started production in Brisbane in June. And 2001 will also see the addition of an Australian rider to the Mapei cycling team.

by Gianni Guidi

Mapei has landed in Australia! Although the Italian multinational has had a foothold Down Under since 1994 with the opening of Mapei Australia and a sales office in Brisbane, it has recently also officially opened a new manufacturing plant capable of producing an initial 30,000 tons of cementitious adhesive powder per year. The first sacks of Australian-made KERABOND, KERAFLEX, and KERASET left the Brisbane production line last June. For the moment all of the other Group products sold on the Australian market, which recently also introduced international standards for ceramic tile adhesives, are imported from the United States, Europe, and Singapore. Mapei Australia's plant currently employs 20 people and is run by Les Taylor, a manager with a financial background who has taken care of Mapei's business in Australia from day one. This is the 26th of the manufacturing plants planned by

Giorgio Squinzi as part of the Group's internationalisation programme which began at the end of 1970s. And by our standards, it's still quite small. In fact, it's very small compared to most of the other Mapei factories around the world, but it is considered large enough to maintain the growth of our Australian business. Squinzi had this to say to a local journalist during his first visit to Australia: "This

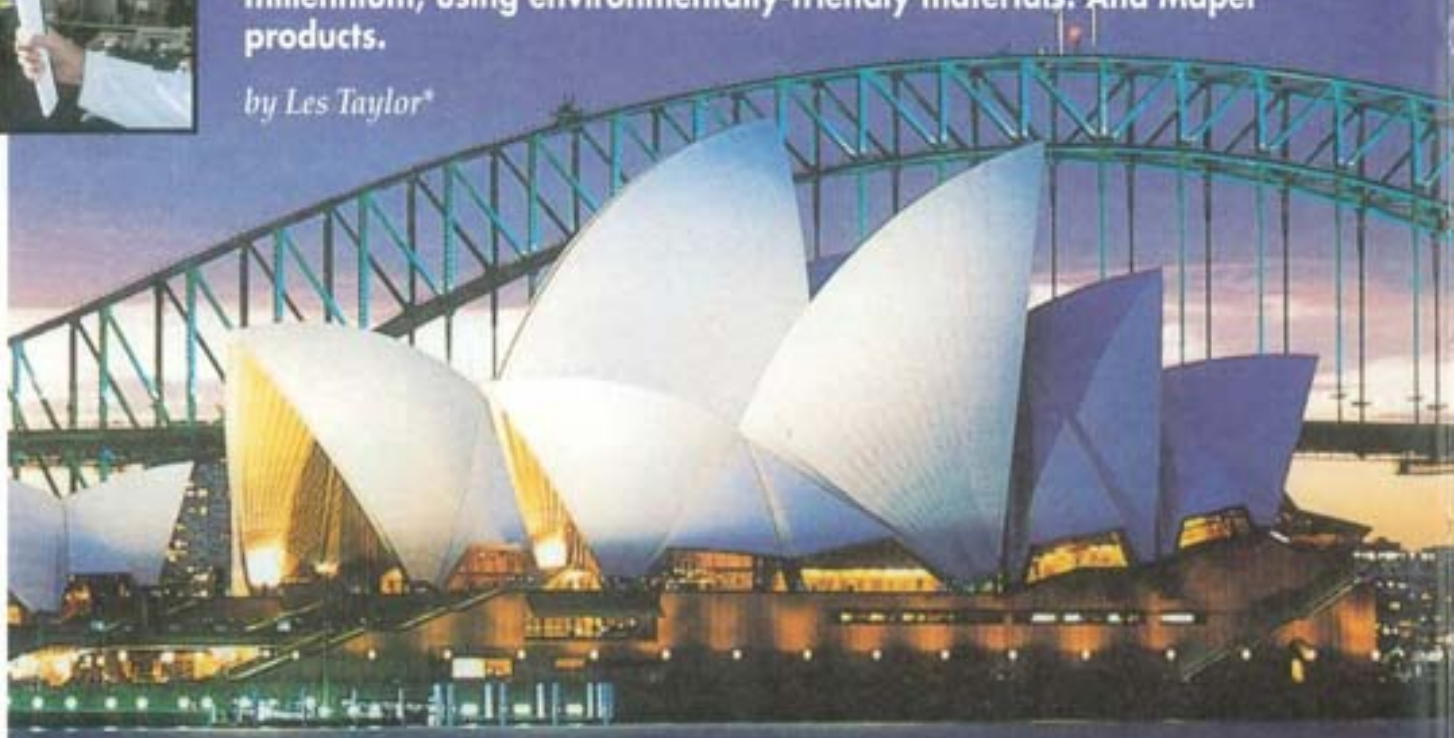
plant is just the right size at the moment and boasts very avant-garde technologies as the best of Mapei's know-how has been poured into it. This means that it is highly automated. But all aspects of Mapei Australia have expanded recently thanks to a series of investments, which included marketing and sales. As time goes on, we will decide whether to broaden the range of products manufactured here or not. Our ambition is to become market leader here too, just as we are all over the world."
Mapei products, already famous throughout the world for their environmental friendliness, have already been used in number of very prestigious projects in Australia: the stadium and aquatic centre used in the Sydney Olympics (see separate article), Sydney International Airport, and Brisbane International Airport. Both Giorgio Squinzi and Les Taylor are convinced that growth in the building trade, already speeded up in Sydney by advent of the Olympics, will continue in other areas too, such as Melbourne (where the Commonwealth Games will be held in 2002), Brisbane, and Queensland, all places where tourism is another growth industry. "I was very impressed by this country. And I am convinced that demand for ceramic tiles here will one day reach European levels. Mapei is preparing itself right here in Australia for when that time comes."
Squinzi is so sure that the building, ceramics and adhesive business is going to boom that he has included Michael Rogers, a local young blood fresh from representing his country in the Olympics, in the Mapei cycling team which will fly the Group colours in all of the major races in 2001.

Left, Les Taylor and Giorgio Squinzi. This page, some photos of the start of production at the Brisbane plant.

the SYDNEY OLYMPICS

New facilities have been built for the first Olympiad of the new millennium, using environmentally-friendly materials. And Mapei products.

*by Les Taylor**



It's a little bent and angular, but the Olympic torch (inset above) represents the spirit of ancient Greece; the flickering glow of a story that began 2,700 years ago with the lighting of a sacred flame on the altar of Zeus. For the ancient Greeks that flame stood for fair, honest competition, or the gods would send down blazing thunderbolts and great confusion. The festivals held at Olympia came to an end in 394 A.D. when the gods were distracted and the games were rigged and the spirit of fair play was corrupted. The games were revived by De Coubertin, founder of the modern Games ("It's not the winning that's important..."), and now all that the Games have to symbolise is represented by the flame of that torch, carried by hand by a human runner. For 2000 the Olympics have been reinterpreted and expressed in a particularly Australian way, and the Olympic torch has an 'L' shape that recalls a boomerang. But it's the spirit that counts, the fact that, on the 15th of September, the Sydney Olympics began.
(Excerpt from I Viaggi di Repubblica – 20th July 2000)

Sydney, Australia: the first Olympics of the new millennium, the 27th modern Olympiad. And Sydney did full justice to it, adding a solid complex of new structures to a now well-established urban development project. All was done with an emphasis on ecology and alternative sources of energy, using natural light and ventilation, and extremely small amounts of chlorine in the pools – as an alternative, special filters were installed to purify the water. As a finishing touch, no less than 200,000 trees were planted. Such an attitude is typical of Australia, where the environment is thought of as the people's common heritage, and so deserving of protection. The Olympics were held between 15th September and 29th October, (followed by the Paralympics from 15th to 29th October, with 4,000 disabled athletes taking part). They were concentrated around Homebush Bay, an area situated about 15 km from the centre, well placed for trains, roads and a water transport system.
The area used covers 660 hectares on the seashore, at one time the most heavily polluted area in the locality, hosting as it did waste dumps, factories and a slaughterhouse - and for this reason it was a desolate, abandoned brownfield site. Now two architectural jewels rise into the skyline. They have already been in use for several years – Stadium Australia, venue for major athletic events, and the Olympic Aquatic Centre for Olympic water sports. And Mapei played a role in all this, a role we will examine in more detail in the following pages.

THE MEETING PLACES, BUILDINGS AND FACILITIES OF HOMEBUSH BAY

❶ Sydney SuperDome
- Australia's biggest indoor space for sport and entertainment, with a maximum capacity of 20,000 and adjacent parking for 3,500 vehicles.

❷ Stadium Australia
- seating capacity for the Games - 110,000.
- venue for field athletics, marathons, football and the opening and closing ceremonies of the Paralympics
- after the games, it will hold 80,000 spectators for sports and cultural activities

❸ Sydney International Athletic Centre
- Stadium for training during the Games

❹ Sydney International Aquatic Centre
- opened October 1994
- more than 5 million visitors since opening
- pools for Olympic competitions, training and leisure in a temperature-controlled building
- green area, nursery/children's play area, gym, restaurant and shops
- number of spectators currently 4,400, rising to 15,000 during Games

❺ State Hockey Centre
- opened August 1998
- new surfaces on the two hockey pitches
- capacity during Games - 15,000

❻ Athletes' Village
- accommodation for 15,300 athletes and other team members
- new solar-energy powered residential area for 6,000 people after the Games

Stadium Australia

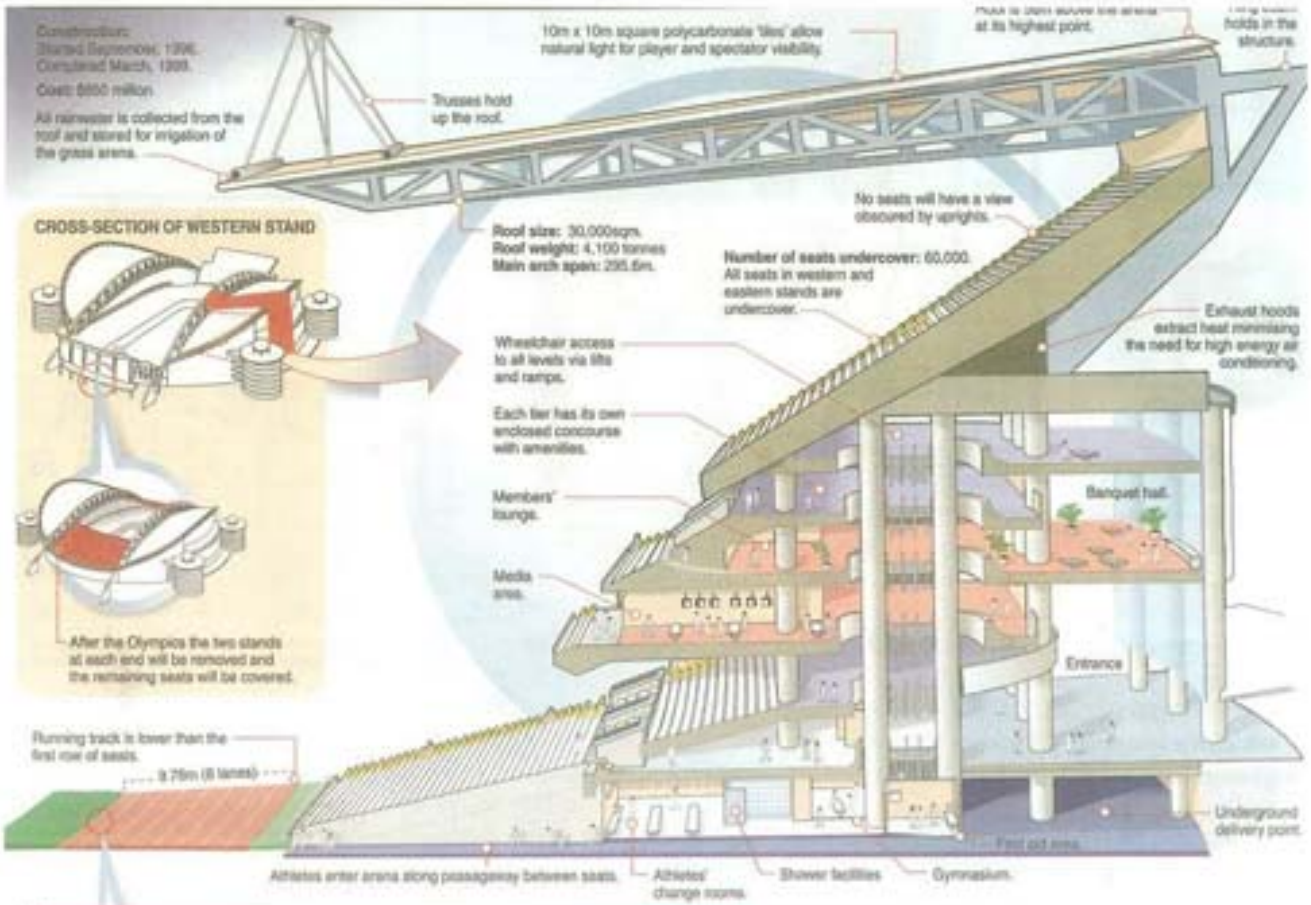
The stadium covers an area of around 16 hectares and was designed by Hok+Lob Architects, the world's greatest experts in sports installations, in association with the Australian studio Bligh Voller Nield. This structure follows in the tradition of Sydney's two trademark architectural symbols – the Harbour Bridge and the Opera House – and is an example of what those in the sector define as fourth generation, in that it unites flexibility, functionality, accessibility and digital management of services. Thanks to the adoption of a system of special mobile stands on rails that allow the Stadium to be transformed rapidly according to the kind of sports event to be held there, from athletics to rugby or football. The capacity for the Olympiad is 110,000 seats, but later the athletics track will be removed, and the stadium will host only rugby and hockey matches or other events such as concerts – at this point its capacity will be reduced to 80,000, with the removal of the upper sections of the side stands.
The structure of the Stadium was conceived as a series of separate levels. The hyperbolic parabola of the roof, supported at the rear by the stand and at the front by an arched steel truss network, emphasises this greatly. It also allows the roof to cover twice the depth a more conventional cantilever structure could, and serves as a wide basin to collect rainwater, which is then used for the toilets. Much use has been made of steel and reinforced concrete in its construction. The roof is covered with transparent polycarbonate panels that encourage the growth of the grass on the playing surface and control excessive contrasts in levels of light. Particular attention has been paid to bioclimatic aspects, ensuring minimal adverse environmental impact. A recycling plant uses rainwater to irrigate the playing surface, while glass sunscreens cut down overheating and reduce the amount of electricity used. Television installations provide the highest quality reception, as the stadium functions like a huge digital T.V. studio. The lighting is powered mainly by solar energy installations.

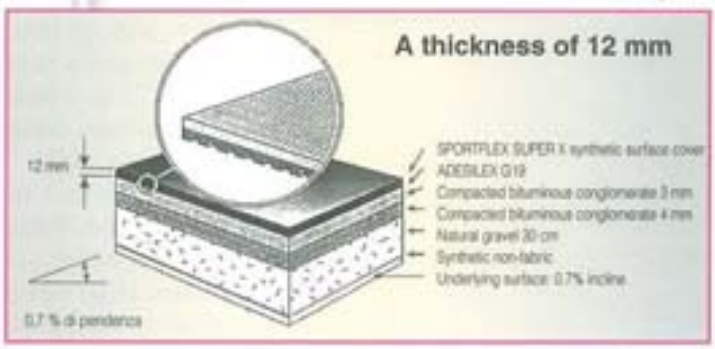
The Olympic tracks

Mapei products have also been used inside the competition stadium, on the track surfaces – the athletics track, the high-jump apron and the warm-up track. The material is Mondo Sportflex Super X rubber, comprising 80% synthetic and 20% natural rubbers in two 6mm layers. The harder surface layer enhances the athletes' performance, giving a greater return of energy. The under-layer is less dense and slightly softer, so as to lessen muscle fatigue, absorbing shock at the moment of impact. Although only a few millimetres thick, this lends solidity to the track. It is no longer poured, but rather glued directly to the soil surface with Mapei's ADESILEX G19, the two-component polyurethane adhesive characterised by its elasticity and resistance to humidity, heat and atmospheric aggression. Recent studies have shown that the adhesive plays a vital role in the performance of sports surfacing systems.

The Structure of the Stadium

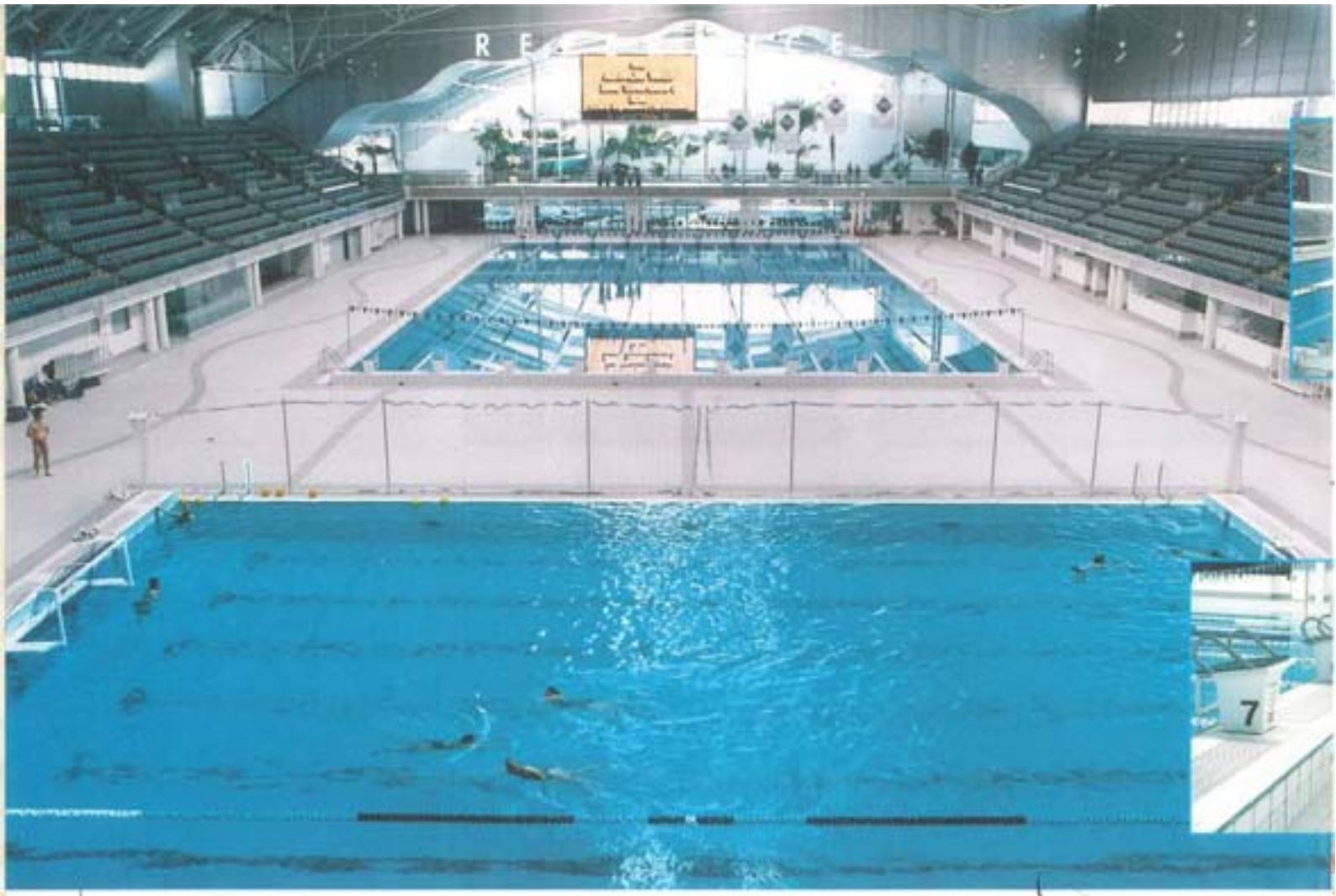
As well as playing a role in surfacing the Olympic tracks, Mapei was also involved in the stadium structures. Here, products developed specifically for smoothing reinforced concrete were used over an area of 3,300 m². These products were PLANO 3, the self-levelling and rapid-hardening smoothing compound, NIVORAPID, the ultra-rapid drying thixotropic levelling cement screed also used for vertical applications, PIANODUR R, an ultra-rapid setting, self-levelling compound for substrates, ULTRAPLAN, the self-levelling ultra-rapid setting compound for thicknesses of 1 to 10 mm per coat, and PRIMER G, the synthetic resin-based primer in water dispersion.





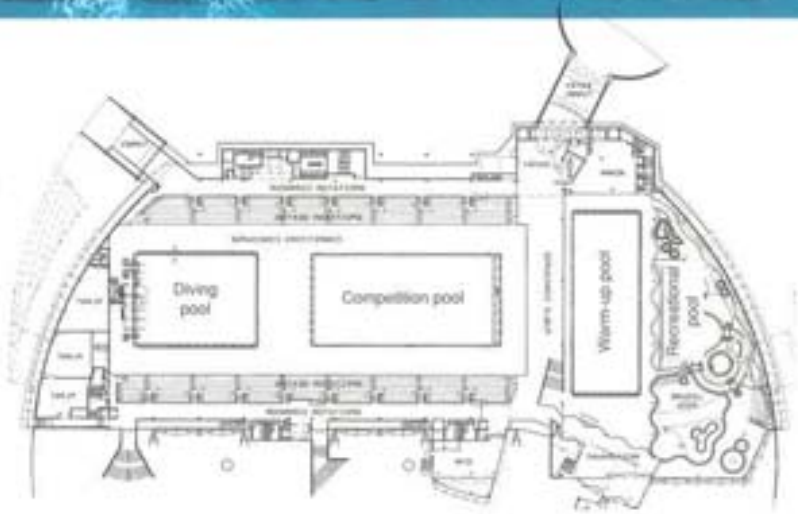
Sidney International Center

The same track-surfacing system was used in the Sydney International Centre, the training stadium. Here, too, the surface was installed using ADESILEX G19.

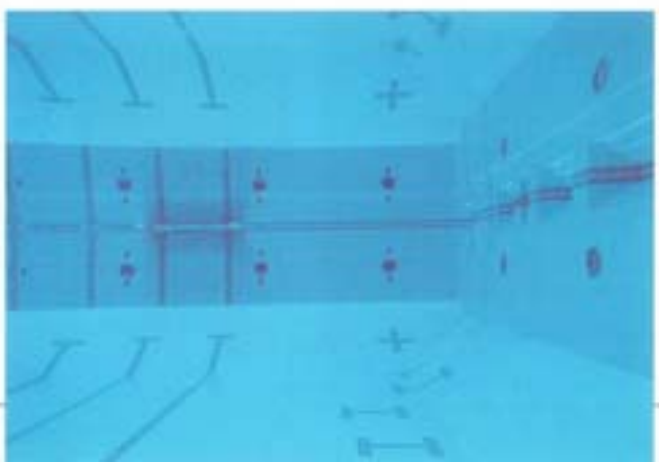


The Olympic Aquatic Centre

The construction of the gleaming white Olympic Aquatic Centre was begun after an invitation to tender in 1991. This was won by a consortium made up of the Civil&Civic company, Cox Architects, Peddle Thorp Architects and the engineers of Ove Arup. This facility is situated in the centre of the Olympic area, and was designed with the main aim of having a minimum environmental impact. Its shape, with the steel arch of the main structure partially underground, allows the building to blend in with the surrounding countryside. The south east side was completely covered with ballast, so as to reduce its visual impact. This wall also reduces wind load on the main structure, which forms the base for the temporary stands. During the Games these stands will take the number of spectators from the current level of 4,400 to just under 18,000.



The Olympic Aquatic Centre has already been in full operation for several years – in fact, so far it has already allowed 7 million people to practice their sport. It comprises four separate pools under one roof. These are:



Competition pool – occupying a central position, with an area of 2,500 m², ten lanes and a depth varying between 2 and 3 metres. The pool edge has been designed to regulate the water level, reducing wave effects and making the pool "fast" in competitions.
Diving pool – next to the competition pool. Fully equipped with springboards and platforms, and with a surface area of 33x25

m, this pool is suitable for international diving events. It can also be divided into ten lanes of 25 metres for use as a training pool.

Warm-up pool – a 50 m pool for warming up and training. It has an unusual feature – two thirds of the pool's floor is moveable, so the depth of the water can be varied between 2.5 metres and zero. As a result the pool can be adapted to a variety of activities, from children's swimming to use by disabled people.

Recreational pool – this 1,500 m² irregularly-shaped pool is part of the recreational zone, with a restaurant, bar, gym and an area reserved exclusively for children. There are also several other attractions, from a slide to hydromassage. Very little chlorine is added to the water, which is cleaned using special filters.

The pool was surfaced with more than a million ceramic tiles – 1,060,000, to be exact! The adhesive used was a Mapei product that guarantees a high, stable performance over time – the name GRANIRAPID says it all. This is a two-component system with rapid adhesion and hydration, and virtually zero shrinkage. It has high levels of adhesion qualities on all types of support (including those classified as difficult), and high resistance to knocks, vibration, temperature swings and chemical agents.

KERACOLOR, with the addition of FUGOLASTIC, was used for the tile grouting. KERACOLOR is a prepackaged cement mortar, available in fine and coarse versions according to the dimensions of the grouting, developed for use in external environments with all types of tile, either ceramic or natural stone.

Resistance, compactness and adherence properties were enhanced by the addition of FUGOLASTIC – that is, a latex consisting of synthetic polymers in an water dispersion. Mapei products have also been used elsewhere for the interior surfaces of the Olympic Aquatic Centre – KERABOND, a powdered, cement base adhesive for ceramic tiles for thickness of up to 5 mm, mixed with the elasticised latex ISOLASTIC, to enhance performance. The floors of the changing rooms and commercial and restaurant areas were fixed using KERAFLEX, the powder, elastic medium strength adhesive, and grouted with KERACOLOR + FUGOLASTIC. MAPESIL AC was also used. This is an acetic single-component silicon sealant, particularly suitable for joints subject to a service stretching of no more than 20%.

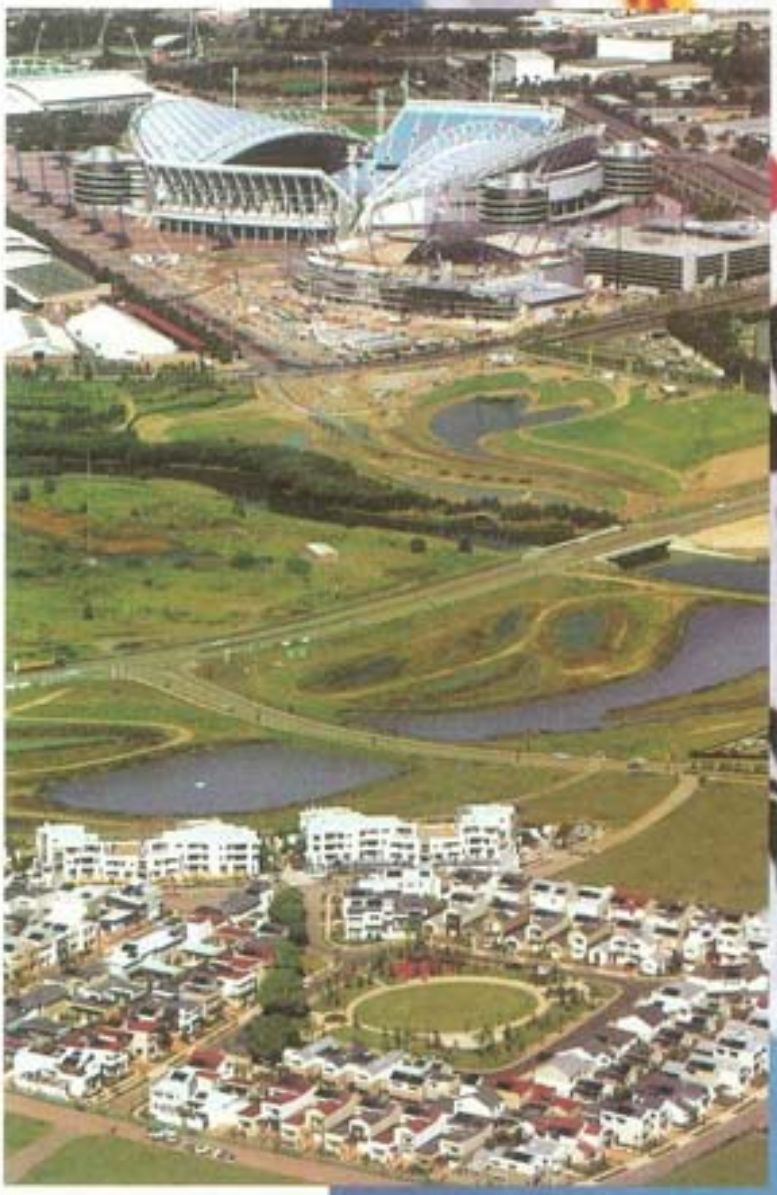
The quality and resistance of the coverings after several years of use and the constant maintenance of the pools confirms the excellence of the system used in their application.

The Sydney SuperDome

The Sydney SuperDome in the Olympic park, covering an area of 3,600 m², is a multifunctional structure with 21,000 ergonomic seats. It is intended mainly for basketball and volleyball matches, but can also be used for meetings, conferences and conventions. Opened in 1999 with a concert by Luciano Pavarotti, the SuperDome was also used for a banquet in honour of Queen Elizabeth. Mapei products were used in this magnificent structure – NIVORAPID, PLANO 3 and PRIMER G.

The Olympic Village

A new residential quarter has sprung up next to the sports facilities, comprising elegant condos – which have already been sold – and small villas that were used by athletes during the games but are now on the market as homes. And here, too, Mapei has made its presence felt, with the products used for installing the ceramic or wood flooring. In the first case, KERAFLEX adhesive and ULTRACOLOR, the rapid setting and drying cement grout for 2 to 20 mm joints, were used. The wood floors were installed using the adhesive LIGNOBOND, a two-component polyurethane product specifically designed for parquet after smoothing and sealing the base with ULTRAPLAN, BIBLOCK, a two-component epoxy primer in water emulsion, and PRIMER G.



800 apartments were also built away from the Olympic village. Mapei products also played a part in these, with 25,000 m² of ceramic wall covering and 15,000 m² of bathroom and balcony flooring, using KERAFLEX, KERAFLOOR, ULTRAPLAN and ULTRACOLOR. However, for the kitchen areas (around 1,500 m²), the MAPEFONIC SYSTEM was used, a rapid, low thickness soundproofing system to eliminate the sound of footsteps.

State Hockey Centre

Hockey is a very popular sport in Australia, and the striking new State Hockey Centre, built in just over a year from March 1997 to August 1998 at a total cost of 15.5 million dollars, is a cutting-edge example of structures designed for this kind of activity. The roof, 25 metres above the track, resembles a glider hanging in mid-air. The complex was designed by the architects Archer Mortlock Woolley, and can seat 1,575 people on two levels. The athletes' changing rooms, physiotherapy and first aid rooms are situated on the first floor, toilets, offices and a VIP lounge on the second. And Mapei's ADESILEX G19 was used in the changing rooms, to glue the resilient flooring.

Other Buildings in Sydney

Sydney has changed a great deal over the last few years. The prestigious American magazine, National Geographic, wrote that "the frenzy of construction and refurbishment has affected every square centimetre of the city." There's, rebuilding, renovation and cleaning work everywhere you look. The cost of accommodating the Games has exceeded 4,000 billion Italian lire, while the sums invested in new buildings, including around twenty hotels, office and apartment blocks, have exceeded 7,200 billion lire. In fact, Sydney is now outstripping Melbourne, and its stock exchange is second only in importance in the Asian region to those of Tokyo and Hong Kong. Let's take a look at some of the new construction work.

Among the infrastructural facilities that have been enlarged and improved in order to handle the enormous influx of visitors during the Olympiad is the **Sydney International Airport**, (pictured below). Several Mapei products have been used here over a total area of 4,000 m^2: they are PLANICRETE, a synthetic rubber latex for cementitious mortars, to enhance their adhesion and mechanical strength, MAPEGUM WP, a liquid elastic membrane to proof the interior, and KERABOND+ISOLASTIC and ULTRACOLOR, to glue and grout the flooring.

The **Lidcombe Railway Station** has also been enlarged, with the "Olympics" exit (pictured bottom left). The **New Southern Railway** has been built to be resistant, aesthetically pleasing and practical, according to the principles that underpin all the new construction work. They were designed by the Caldis Cook Group, architects specialising in transport. Five new lifts surfaced with tiles have been built in the Lidcombe Station, each one capable of carrying forty passengers, together with new pedestrian walkways and platforms able to handle the immense flows of tourists and the consequent heavy

rail traffic. The station's façade is finished with bright red and black vitrified tiles highly resistant to bad weather and graffiti. In this case, too, Mapei products were used, namely PLANICRETE, KERABOND+ISOLASTIC, KERAFLEX and ULTRACOLOR over a total area of around 12,000 m².

The **MacQuarie Apartments** (photo at top of page) is one of the most important examples of modernisation and change in Sydney. It is a luxurious 16-storey complex, covered in glass and terracotta tiles designed by Renzo Piano. The building enjoys some of the best panoramas Sydney has to offer, including views of the Opera House. The MAPEFONIC SYSTEM was used over an area of more than 2,500 m² in Piano's building. This sound reduction system, developed by Mapei, is meeting with great success in Australia. 6,000 m² were also covered with Carrara marble, using Mapei products – MAPELASTIC, PLANICRETE, MAPEGUM WP and KERABOND+ISOLASTIC.

**Les Taylor is Managing Director of Mapei Australia*

Technical Data Sheets for the products mentioned can be found in the following Mapei binders: no.1 Ceramics Line, no.2 Resilients Line and no.3 Building Line

TECHNICAL DATA

SYDNEY OLYMPIC PARK - Sydney, New South Wales, Australia

• Stadium Australia
Designers: Hok+Lobb Sports Architects, in association with Bligh Voller Nield
Work completed: 1999
- Athletics track: Mondo Sportflex Super X rubber, using ADESILEX G19 adhesive, 5,500 m²
- High-jump apron and lateral paths: Mondo rubber bond with ADESILEX G19, 2,500 m²
- Area within track: Mondo rubber bond with ADESILEX G19, 4,000 m²
- Warm-up track: Mondo rubber bond with ADESILEX G19, 9,000 m²
- Reinforced concrete finishing: PLANO 3, NIVORAPID, PIANODUR R, ULTRAPLAN and PRIMER G, 3,300 m²

• Olympic Aquatic Centre
Designers: Cox Richardson Taylor, Peddle Thorp Joint Venture
Consultants: Ove Arup & Partners
Period of construction: 1991-1994
- Competition pool: clinker tiles bond with GRANIRAPID, 2,500 m²
- Training pool: clinker tiles bond with GRANIRAPID, 1,300 m²
- Diving pool: clinker tiles bond with GRANIRAPID, 1,800 m²
- Recreation pool: Bisazza glass mosaic bond with GRANIRAPID, 1,500 m²
- Interior surfaces: Cercom ceramic tiles bond with KERABOND+ISOLASTIC
- Recreation areas and changing rooms: Cercom (walls) and Cesi (floors) tiles bond with KERAFLEX

For all these areas:
- KERACOLOR+FUGOLASTIC grouting
- MAPESIL AC joints

• Olympic Village
Designers: Archer Nortlock Woolley Architects
Period of construction: 1997-1998
- Products used: KERAFLEX, ULTRACOLOR, LIGNOBOND, ULTRAPLAN, BIBLOCK, PRIMER G

• Olympic Apartments
Designers: HpA Architects
Completion: 2000
- For bathrooms and balconies: ceramics bond with KERAFLEX, KERAFLOOR, smoothing with ULTRAPLAN and grouting with ULTRACOLOR
- Kitchen area: ceramic floor soundproofed with MAPEFONIC SYSTEM

• State Hockey Centre
Designers: Archer Nortlock Woolley Architects
Completed: 1998
- Changing rooms: ADESILEX G19

• Sydney SuperDome
Designers: Cox Richardson Architects – Devine De Flon Yaeger
Completed: 1999
Products used: NIVORAPID, PLANO 3, PRIMER G

Sydney International Airport
Designers: Woodhead International
Completed: 2000
Products for installing ceramics: PLANICRETE, MAPEGUM WP, KERABOND+ISOLASTIC, ULTRACOLOR for 4,000 m²

Lidcombe Railway Station
Designers: Caldis Cook Group Architects
Completed: 2000
Products for installing ceramics: PLANICRETE, KERABOND+ISOLASTIC, KERAFLEX and ULTRACOLOR for 12,000 m²

MacQuarie Apartments
Designers: Gazzard Sheldon Architects
External façade design: Renzo Piano
Completed: 2000-11-22 MAPEFONIC SYSTEM for over 2,500 m², and products for fixing Carrara marble for over 6,000 m²: MAPELASTIC, PLANICRETE, MAPEGUM WP, KERABOND+ISOLASTIC

PORTFOLIO

Some of the most prestigious buildings in Australia where Mapei products have been used.

▲ Palazzo Versace Hotel, Gold Coast, Queensland.
Here under construction, set to open on 7th December 2000.
LIGNOBOND adhesive has been used for the wood floors.

▲ Aquatic Centre, Melbourne, Victoria.
Covering for 1,100 m² with clinker and vitreous mosaic, fixed with GRANIRAPID and grouted with KERACOLOR and ULTRACOLOR. Jointed with MAPESIL AC.
Water proofing of reinforced cement was carried out using PLANICRETE SP with IDROSOLEX PRONTO

◀ Brisbane Airport, Queensland.
Porcelain tiles fixed with KERABOND+ISOLASTIC, grouted with KERACOLOR

The Pope in the Holy Land

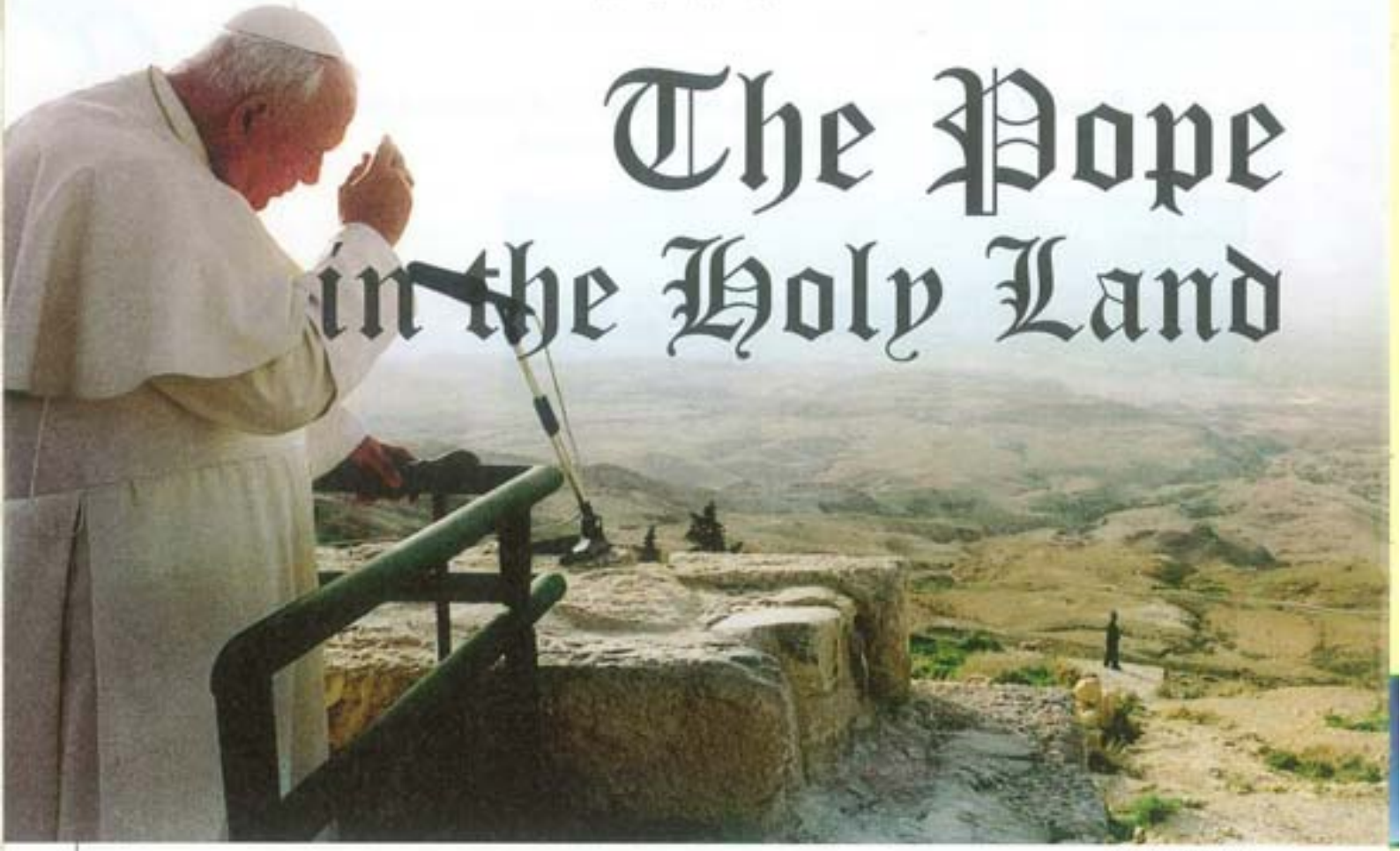


Photo: Olympia

From Mount Nebo to the Sea of Galilee.

It was a wonderfully powerful and moving image: the Pope on Mount Nebo in Jordan, the same spot to which the Lord brought Moses over 3,000 years ago to show him the Promised Land. Pope John Paul II held the rail with trembling hands and gazed out over the valley, river and mountains. Every rock, bush, and wrinkle in the arid terrain in this area recalls the Bible. It was here that David, Joshua, Saint John the Baptist, Jesus, and the horns of Jericho (back in the headlines thanks to an archaeological dig. See following article), and the invective of the Pharisees all come together in an incredible mix. For believers, this really is a breathtaking scene. And Karol Wojtla, the 80-year-old Pope so dear to the hearts of Catholics and humanity in general, was moved. According to tradition, Mount Nebo is the mountain on which Yahweh showed Moses the way to the land of milk and honey: "This is the Land for which I swore to Abraham, Isaac, and Jacob. I will give it to your progeny." And it is from here too that the Pope began his visit to the Holy Land in the second half of March. First came a stop-off in Jordan which gave him the opportunity to relaunch his big project, the trilateral talks between Jews, Christians, and Muslims, the three historical monotheistic religions. After that it was on to the West Bank, Bethlehem and the celebration of the Eucharist in front of the Basilica of the Nativity.
After this, his Holiness travelled to Israel and Jerusalem, the most

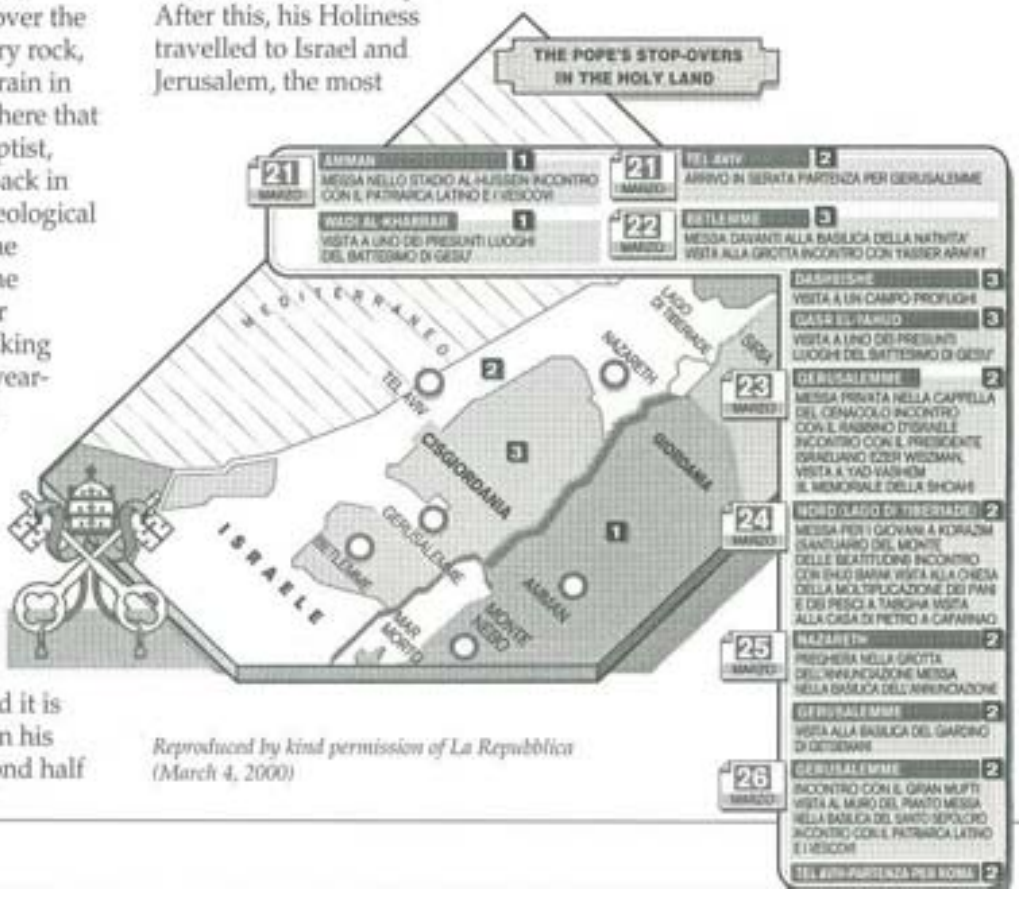


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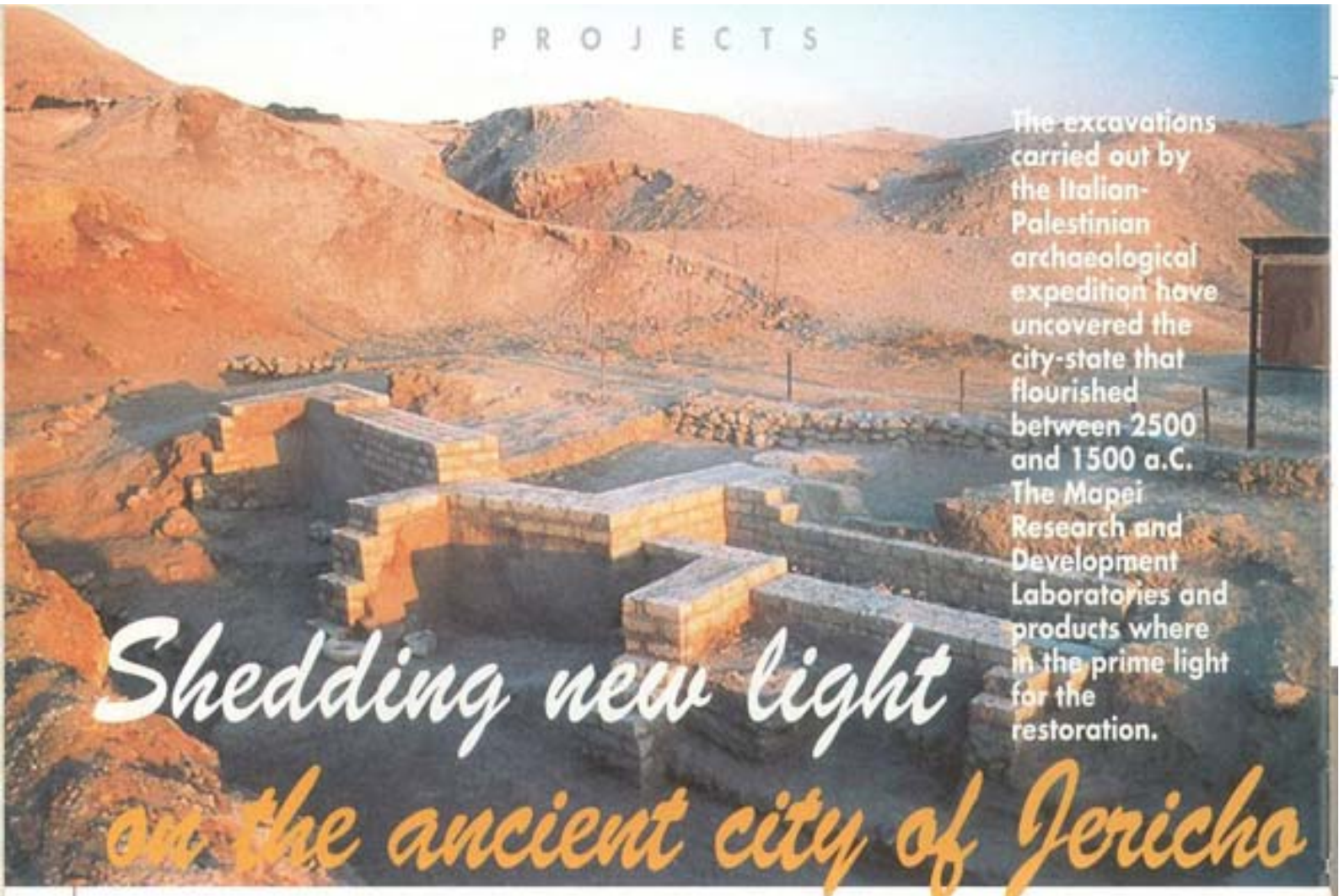
Photo: Olympia

important religious centre for Jews, Christians and Muslims alike, capital of Israel yet also the city the Palestinians want as the capital of their future State. Finally, he went north to Korazim, the area in which the Sanctuary of the Mount of the Beatitudes is located, which overlooks the splendid Kineret or the Sea of Galilee where he celebrated mass in front of 20,000 young people. John Paul II finally finished his journey in Nazareth. The church in Korazim has still not been completed and it is estimated that Mapei products will be used on 14,000 square metres of the project under the direction of Many Shany, general manager of the Israeli company representing Gruppo Mapei, Negev.Alony of Haifa. The

project involves the re-covering of the exterior with 30X60 slabs of imported Italian sandstone rock.
Because of the size of the slabs and the high temperatures to which they will be exposed, KERABOND mixed with ISOLASTIC is being used, i.e. a cementitious powder adhesive for ceramic tile mixed with an elasticising latex. ULTRACOLOR, a cementitious jointing mortar, is then used for grouting the slabs. The work, which stopped over the summer due to excessive heat, will be completed by the end of the year.

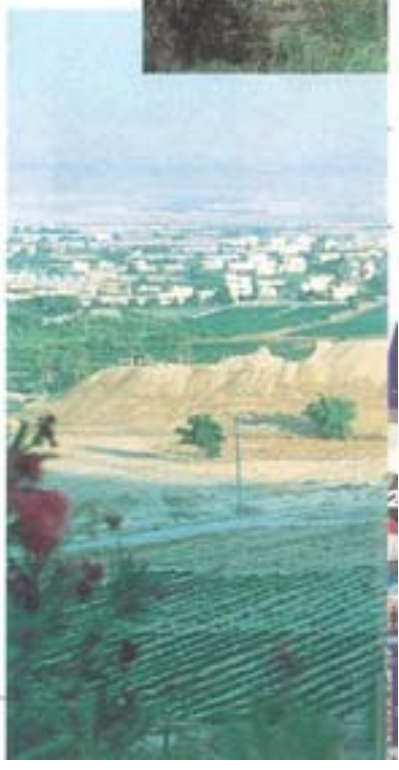


Shedding new light on the ancient city of Jericho

The excavations carried out by the Italian-Palestinian archaeological expedition have uncovered the city-state that flourished between 2500 and 1500 a.C. The Mapei Research and Development Laboratories and products where in the prime light for the restoration.

*by Nicolò Marchetti, Lorenzo Nigro, Hamdan Taha, Francesco Nigro, Tiziano Cerulli **

The archaeological expedition involving Rome's La Sapenzia University and Palestine's Department of Antiquities which was restarted in Tell es-Sutlan in the spring of 1997, has led to the discovery of the ruins of fortifications and buildings from the ancient city of Jericho, dating it to the 2nd and 3rd centuries BC. All of the areas covered by the dig have yielded very important data. Right from the start, the project has concentrated on the study of the urban structure of this extraordinary city, renowned as the world's oldest thanks to its astonishing 10,000 year history. 40 years on from the end of the last dig, the ancient city of Jericho (Tell es-Sultan or "Hill of the



**Nicolo Marchetti and Lorenzo Nigro are the leaders of Rome's La Sapienza University's archaeological expedition in Palestine, Hamdan Taha is director of the Palestinian Department of Antiquities, Francesco Nigo is architect to the Jericho expedition, and Tiziano Cerulli is head of the Testing Laboratory at the Mapei Research and Development Centre in Milan.*


HOTO 1


PHOTO 2

Photo 1, area B after restoration. Note the information board.
Photo 2, the Italian-Palestinian expedition at the end of the 1999 dig.
Photo 3, the dwellings in area F, 2500 BC.
Photo 4, Mount of the Temptations, which dominates the Jericho Oasis.
Photo 5, Tell es-Sultan (Jericho) from the south-west.

PHOTO 3

Sultan" in Arabic), now under the control of Palestine's Department of the Antiquities, is being excavated once again thanks to the joint Italian-Palestinian effort.

Situated on the raised western rim of the Jordan Valley, just eight kilometres from the northern shores of the Dead Sea, the Jericho Oasis (Oasi di Gerico) was one of the ecosystems that most encouraged the development of early agrarian society in the Near East. This was thanks to the underground river which is fed by the stratified rock in the mountains of the Desert of Judah and resurfaces at the foot of the limestone cliff dominated by the Mount of Temptation.

The archaeological expedition, which is financed in part by the Italian Ministry for Foreign Affairs and led by Hamdan Taha, Nicolò Marchetti and Lorenzo Nigro, students of Paolo Matthiae, began the third stint of digging and restoration in October-November 1999, concentrating on Bronze Age Jericho. They worked most specifically on two areas of the settlement, the first dating back to between 2,900 and 2,300 BC, a time when the city was first founded in Palestine, and the second to 2,000 and 1,550 BC when Jericho was one of the main city states of the region.

Birth of the first city

An area of beautifully preserved private dwellings was discovered in the very earliest version of the city of Jericho, dating back to the third millennium BC. Each house had an angle devoted to food preparation with grinding equipment, preservation pots, and a hearth. The largest of the houses consists of an entrance area with a large earthenware jar for corn built into the flooring, and a main room. Large preservation jars, a surface used for cutting and butchering meat (beef), and a large range of utensils and stone knives for the latter were found in the main room. In another part of the site, to the south, where a building had been found immediately inside the monumental six-metre high, four-metre thick air-dried brick walls in 1997, the archaeologists unearthed kitchens in which there were two huge mortars


PHOTO 4

PHOTO 5

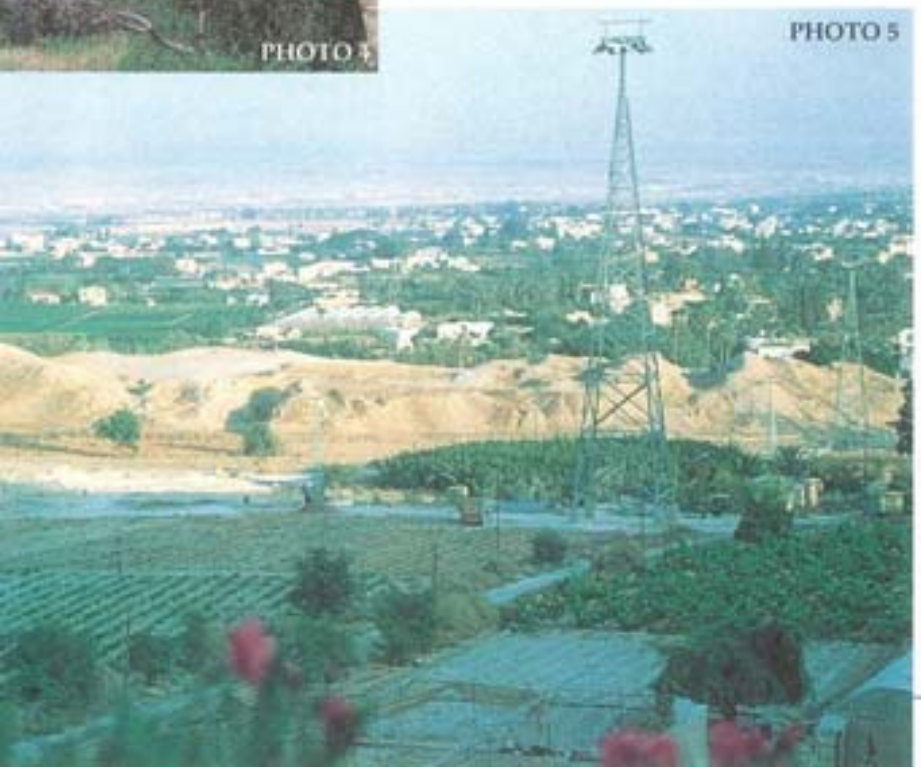



PHOTO 6

Photo 6, 1800 BC tomb, area G, 1999 dig. Note bronze earrings in situ.

which had been used for grinding grain (barley) and legumes (lentils). Pestles, weights, ceramic pots and other utensils bear witness to the every-day life in the building, too. In 1999, a new area was opened up on the slope facing Elisha's Spring where there are the remains of huge stone structures. The first surprise came with the discovery of a very rich 1800 BC tomb just a few centimetres below the surface, in which a girl of around 13 years old had been buried with her jewellery and amulets. A small sacrificial gazelle had also been placed beside her. A magnificent brick building dating from 2300 BC which had been destroyed by a terrible fire was also found at a depth of 2 metres.
An area of storehouses was also discovered, containing a host of earthenware jars which had been crushed and sealed by the carbonised roof beams. These probably contained the food for the staff who worked in this public building. It and its contents are being thoroughly investigated during the 2000 dig.


PHOTO 8


PHOTO 9

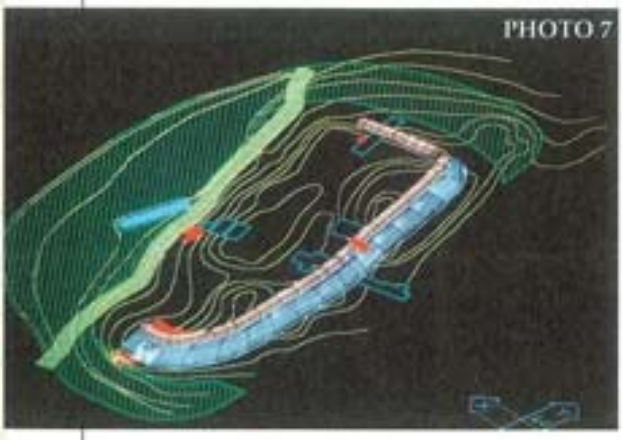


PHOTO 7

The city of the second millennium BC

Imposing 18-metre ramparts enclosed the sides of the settlement for four centuries between 2000 and 1500 BC. The oldest rampart consisted of a steep slope covered in limestone and surmounted by a fortifying five-metre thick brick wall. The second rampart, erected in around 1650 BC, had a very impressive six-metre high megalithic wall at its base. The latter would have helped contain the thrust of the rampart embankment.
The discovery in 1997 of the corner of a large stone structure inside the oldest rampart indicated that it might have been connected to the city gate which has never been found in 130 years of excavations. Thus a new area was opened up and a seven-metre wide stone tower joined to the curved stone wall was discovered beneath a five-metre mound of waste earth dumped during the 1930s digs. The most plausible theory is that this particular tower was connected to a

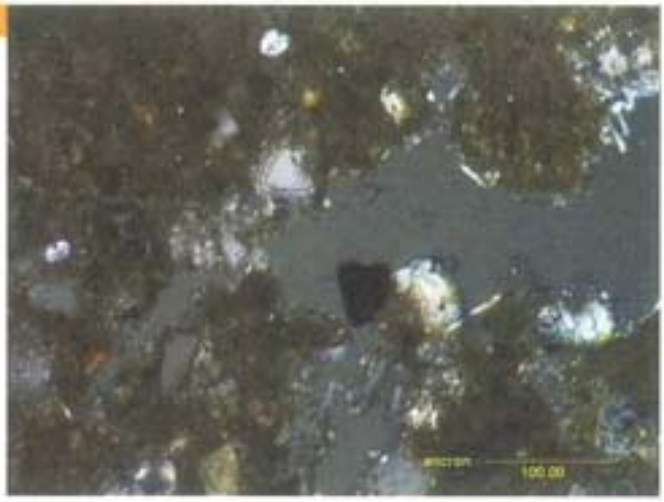

PHOTO 10

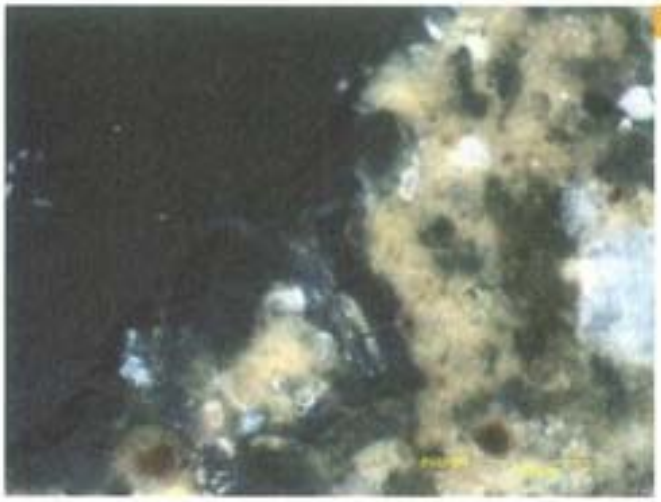
Photo 7, reconstruction of Jericho approximately 1900 BC. The first rampart is seen in white with the (still unconfirmed) area E gate, while the lower city around the spring is green.
Photo 8, the megalithic wall dating from 1600 BC at the base of the second defensive rampart in area A.
Photo 9,work in progress, area A, excavation of the layer with the large collapsed 1700 BC building.
Photo 10, restoration and reinforcement of the great brick tower belonging to the fort in area A, 1800 BC.
Figure A, original untreated brick.
Figure B, original treated brick. Note the silica "bridges".
Optical microscope imaging courtesy of Mapei R&D laboratory.

gigantic 1800 BC building which had been excavated nearby and which seems to have consisted of a fort defended by brick walls and towers. The two fortifications may thus have been part of an imposing access system to the city which faced towards Jerusalem.

Preserving the wall

There are very specific problems involved in preserving major pre-Roman archaeological sites. Earth-based architecture (i.e. the brickwork structures) is quite fragile and, once exposed, can be almost completely obliterated in the space of just a few years. Another central problem is water which creates serious erosion on the artificial hillsides formed by the succession of human settlements.
The archaeologists' mission in Jericho was to develop effective solutions to these problems. The air-dried brickwork was reinforced using infiltrations of ethyl silicate. Once set in the brick, this would prevent rain water from washing away clay particles. The optimal formula was developed by Marco Squinzi and Pasquale Zaffaroni with the help of the Mapei Research and Development Laboratory which also supplied 100 kg of the material to test its effectiveness before launching a wider restoration and preservation programme at the site.
The archaeologists' final objective is to set up a National Archaeological Park covering the Jericho area and the other ancient sites near Tell es-Sultan. With this in mind, a request has been made to move the road which presently cuts the site in two, while structural renovation work will also have to be carried out in the area of the famous Neolithic tower which is threatened by the collapse of the reinforced cement platform above it which was built during the Israeli occupation. The bricks from the walls of Jericho consist of unfired clay worked while wet and then dried in the sun. Experiments were conducted both in the laboratory and in the field as part of the collaboration between Mapei and the Jericho archaeologists in order to ascertain just how suitable ethyl silicate would be to reinforcing unfired earth brick walls. During the first part of the study, the composition of the materials making up some of the brick samples was established, as was the reinforcing action of the ethyl silicate. After this, some sections of the walls were treated to test their response directly in situ. About four months after the reinforcement work was carried out, results varied from section to section. A new series of samples was taken and analysed in the lab to establish which processes and variables affect the success or otherwise of the treatment. Some important differences were found between the brick samples taken from the same sections of wall. On the basis of the test results, it was confirmed that the different response by the bricks to the silicate reinforcement work was closely linked to the nature and ratio of the materials contained in the bricks. The presence or lack of clay plays a fundamental role both in the intrinsic durability of the bricks themselves and in the effectiveness of the treatment. This is because when wet raw earth is being worked, the clay absorbs the intermolecular water and swells.
When the mixture dries, the clay particles provide excellent cohesion due to the superficial tension forces which are mainly electrostatic in nature.
Clay-type materials are also responsible for the interaction between the reinforcement material described above and the particles of the material, an action which results in a three dimensional continuous mesh (Figure A and B). It was also demonstrated that the mechanical properties of bricks containing adequate quantities of clay and formulated using correct raw material ratios remain more or less unaltered over time.





Laboratory results

If mixed in the right proportions and correctly worked, unfired earth has good mechanical resistance and durability properties. Proof of this came from the bricks from the walls of Jericho which were still in a generally good state of preservation when we received them. The nature of the raw materials used and the mix ratios of same play an essential role

in the quality of the final product. In-depth studies indicate that the sand-clay mixes with a ratio of between 4:1 and 3:1 (in terms of weight) result in optimum durability and mechanical properties when it comes to atmospheric agents. The lab tests told us that a sediment which was marine in origin had been used to make the Jericho bricks. The mixtures consisted of fragments of fossiliferous limestone, organic remains, and feldspar-quartz sand in a carbonate matrix, with a very small proportion of clay.
Six samples representing the various sections of the walls were examined. These turned out to be in varying states of preservation, an indication of the lack of homogeneity in the mixtures and thus limited mixing of the raw materials. In addition to this, it was found that in some samples, the clay mineral component was practically zero. Reinforcement using ethyl silicate showed very different results not only from sector to sector but also from brick to brick. Four months on, some of the treated bricks were showing signs of very severe deterioration while others which had not been treated but were subject to the same weather conditions were perfectly preserved. Of the tests performed, measuring the specific surface area (BET) can give a good picture of the physical changes in materials following treatment. The untreated samples had BET values up to 70 times greater than the treated ones. The reduction in the specific area is linked to the fact that precipitated silica occupies and saturates the porous spaces, especially the microporous ones, which have the greatest influence on the figure.
The precipitation of silica in the microporous structure of the mixtures was highlighted using UV microscopy when it was observed that spaces of over 300 microns in size remained accessible to the resin while the smaller ones were filled by silica in a continuous or filamentous mass.
The size of the reduction in BET and the presence of amorphous silica in the microporous structure do not, however, represent unequivocal parameters for the evaluation of the effectiveness of the ethyl silicate treatment. The presence or lack of clay in the mixtures does, however, seem to play a fundamental role.

Photo 11, work in progress, area F. Restoration expert Mohammed Diyab begins reinforcing an air-dried brick wall from 2500 BC.

Photo 12, restoration and reinforcement of the great brick tower belonging to the fort in area A, 1800 BC.

Tests on the monuments

Two walls were chosen to test the treatment on the basis of the results obtained. The ethyl silicate was injected into the wall using a container situated at a height of 1.5 metres fitted with a manifold capable of supplying six injectors simultaneously.
The process was monitored continuously and took several hours, requiring a large quantity of material to complete the parts of the walls selected, as indicated by the results of the sample tests.
The treated areas were then immediately covered with plastic sheeting. In one area, with the injectors inserted to a depth of 5-7 cm into the wall, the absorption rate was around 25 litres per 2 square metres (with complete reinforcement of the structure - including internally). By way of comparison, spray treatments were tried on some parts. This was faster but less effective because the material did not penetrate the brick mass to the same extent. And so this was how the 1800 BC brick fort in the southern part of the city was preserved in 1999. With regard to definitive results from the field, we will have to wait at least a year before we will have enough significant data or will even have had enough time to directly observe the state of preservation of the treated areas in comparison with the untreated ones.

Sealing cracks caused by erosion

All of the erosion-induced cracks in the famous air-dried brick walls were also filled in with MAPE-ANTIQUE LC, a sulphate-resistant binder, which was mixed with bits of original brick which had crumbled from the walls (this also kept the colour

Photo 13 and 14, restoration of building along wall, area B, 2300 BC.
Photo 15, restoration of a late Roman tank.

uniform).
The MAPE-ANTIQUE system is ideal for restoring historical buildings as it is sulphate and resistant to efflorescence and achieves dimensional stability quickly. These characteristics are a direct consequence of the low levels of lime present. Unlike normal binders where lime levels remain high for years, lime levels are negligible after just one week.


PHOTO 13


PHOTO 14

In 1999, extraordinary protection and evaluation work was done on the area of the 2300 BC building along the wall: the ancient walls, partly patched up with modern brick, were covered with a so-called sacrificial layer consisting of MAPE-ANTIQUE LC and earth, which perfectly protected the structure without changing the character of the monument itself.
In order to protect the monuments for as long as possible, some way will have to be found to drastically reduce the direct action of atmospheric agents. Only one solution is both practical and effective and that is to place covers over the excavations. Unfortunately, this would be expensive as it would require the careful planning, selection, and putting in place of the materials involved. The current expedition is also planning to cover the areas containing the most important finds. Special attention will have to be paid to the selection of the covering material as it will have to be resistant to quite high temperatures as well as guaranteeing sufficient light to the dig area.
A further problem is the preservation of Trench 1 with the famous Neolithic Tower dating from 8500 BC. This lies at a depth of 15 metres and is in a somewhat precarious state. It will be reinforced and protected under a specific Ministry of Foreign Affairs scheme. Last year, multilingual information boards were put up throughout the site, which is gradually being revealed to us thanks to years of hard work and commitment from a large team of enthusiastic archaeologists and technicians. The new boards should greatly help to explain its archaeology and history to the half million or so visitors that pass through it each year.

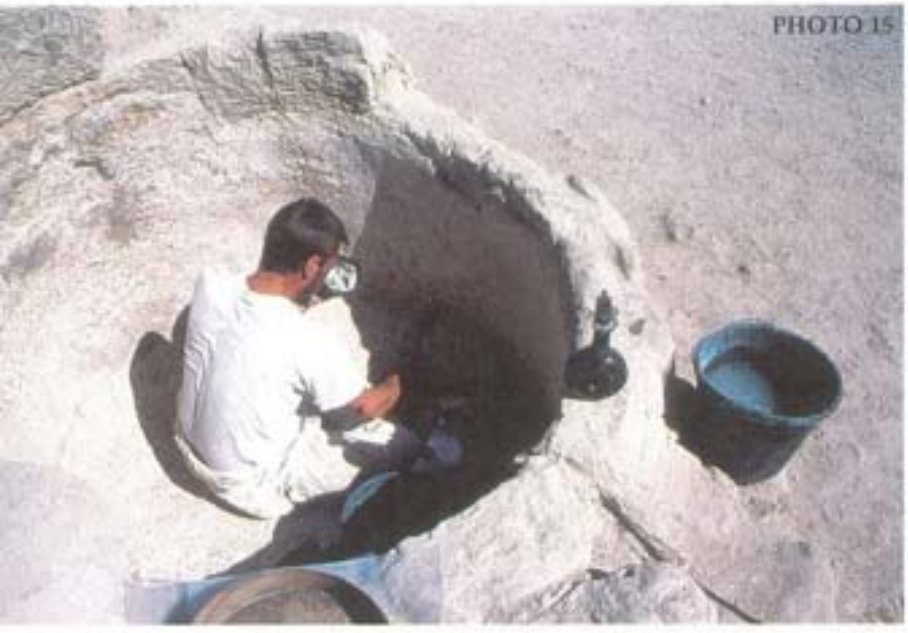


PHOTO 15

The MAPE-ANTIQUE LC technical Data Sheets can be found in Mapei binder no. 3 Building Line.

"Quaderni di Gerico 2 (2000)" (Jericho Notebooks 2 (2000)), a preliminary report on the second archaeological expedition to Tell es-Sultan, was published recently. Edited by Nicolo Marchetti and Lorenzo Nigro, it is available from: Missione Archeologica Italiana in Palestina, Dipartimento di Scienze Storiche, Archeologiche e Antropologiche dell'Antichita, via Palestro 63, I-00185 Rome; email: gerico@uniroma1.it.

See the Mapei Jericho pamphlet for further details. Available on request from: Mapei, fax +39 02 37673214, email: mapei@mapei.it

Northern success for RESCON MAPEI

The Norwegian company, which joined the Gruppo Mapei last year, is leader in the production of additives and chemical products for tunnels – both above and below sea level and bridges. We spoke to its managing director, Trond Hagerud.

by Adriana Spazzoli

Offshore oil drilling and tunnel digging have brought the Norwegian cement industry to the top of the international pile. And, of course, Rescon Mapei, the Norwegian company in which Mapei has held a 51% controlling stake since October 1999, is deeply involved in both of the aforementioned sectors. Rescon, a guarantee of quality in the reinforced concrete field since the 1970s, is now the new Northern branch office of the Italian multinational. Together with its 107 employees and a turnover of 37 billion Lit. in 1999, it is bringing new Northern technologies to the Mapei system, plus an impressive production capacity and market share in Scandinavia and the Baltic States. Situated in Sagstua in the Nord-Odal area near Oslo, the company specialises in the manufacture of mortars and is the leading company in the specialist marine environment and tunnel products.

"We expect that there will be great value-added co-operation between ourselves and the other Mapei companies," declared Trond Hagerud, managing director of Rescon Mapei. In fact, Hagerud feels that the Norwegian company has most to contribute in the offshore and rock and tunnel digging areas as well as in ambitious bridge designs. And all in the freezing northern climate, of course. "These are the challenges that have made Rescon Mapei what it is today," he adds.

Looking to Europe

The founder and chairman of the Rescon board of directors, Geir Tjugum, saw Europe as a place of opportunity and began actively seeking out European partners. Mapei seemed like the ideal choice to him. "As luck would have it, the other side shared my opinion and now both partners can see the potential that this Latin-Nordic

venture has," says Hagerud.
The Rescon Mapei plant is around 30 minutes by car from Norway's main Gardermoer Airport (Rescon products were used in its construction, by the way). It develops, manufactures, and sells cement technologies and chemical products for the building trade. In Norway, the company is in the top three in each of the segments in which it is involved: thermosetting compositions, specialist cement-based mortars, and additives for concrete. Rescon Mapei is one of the three leading suppliers in Norway in all of these sectors and also intends to improve its position in the other Nordic countries: Iceland, Sweden, Denmark, and Finland. The modern, well-equipped factory is dominated by a new plant for mixing powdered mortars. The mixing plant is completely computer controlled and boasts 36 silos. It is one of the most modern of its kind in Northern Europe, with an annual capacity of 40,000 tons per shift.

1

Science and practicality

Rescon, which will be 25 years old next year, has a fascinating history. Like Bill Gates' Microsoft, it started life in a garage. The grunder spirit, which combines skill, luck, and practical solutions, is still central to the company culture.
"Each Rescon product is developed in-house," confirms Hagerud. "Product development is a day to day, on-going activity at Rescon Mapei."
Now Hagerud wants to continue Rescon Mapei's R&D tradition in collaboration with the renowned Mapei Research and Development Centre. "I am convinced that access to their skills and creativity will prove a very valuable inspiration to our work and in bringing greater specialisation to Rescon Mapei. This in turn will benefit of the whole Mapei system."

Scandinavian rock

As a result of its topography, Norway is the acknowledged leader in the field of tunnel and underground space building, for defensive, communications, and energy purposes. More recently, it has added undersea tunnels which are now taking

2

3

4

the place of bridges to its list. "Rescon Mapei has been involved in manufacturing these tunnel products right from the start," continues Hagerud. "Our job is to waterproof the tunnels by sealing leaks, to make them safe from rock falls, and give them an easy to maintain surface."
Today, Rescon Mapei tunnel products, such as Shotcrete 2000, are being introduced to a much larger European market and the first contracts have already been signed. Rescon Mapei Shotcrete 2000 is famed for its adhesiveness and workability in layers of up to 40 cm thick.

The offshore challenge

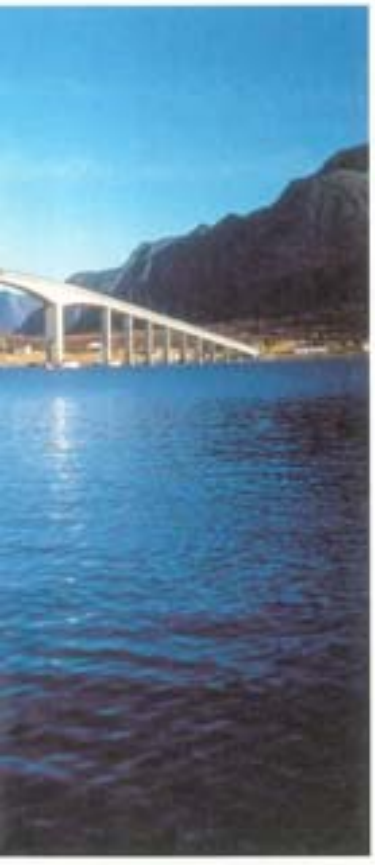
"Rescon expanded when Norway entered its oil era and began its pioneering work in the field of cement offshore construction," observes Hagerud. "Naturally enough, this offered a challenge to innovative companies like Rescon." The company's reference points in the sector include all of the main oil companies and the world's first cement offshore platforms, Troll and Statfjord. The offshore sector demands very high quality, extremely robust and reliable cement which can withstand the rigours of extreme climatic conditions, freezing, sea water, and even oil itself. In addition to all of this, construction and maintenance often take place underwater and at considerable depths.
"Rescon has supplied both cement and epoxy-based products for constructions at 300 metres below sea level and we have also patented an underwater maintenance method for cement called the Rescon Method," Hagerud explains. "Our system consists of additives, which, for example, make cement workable underwater and epoxies for keeping all of the construction ingredients in a single block both above and below the surface. We have also developed protective covers for the surfaces. Rescon Mapei crack repair products have reached leading positions on the market."

A bridge for bridges

The underwater methods and products developed can also easily be used for other marine projects, such as wharves and bridges. Hagerud confirms this: "Safety is an absolute essential for bridges, just like it is for oil platforms. They are also subject to similar stresses with the additional problems caused by mechanical wear and tear, antifreeze salts, pollution from road vehicles, and, of course, frost and sea water. When sea water gets into cement, it makes the inner steel structure expand and the construction crumbles. Our products help to avoid this problem."
Rescon Mapei bridge building and maintenance products are the result of developments made as a result of the company's offshore experiences and have been used in some of Scandinavia's most prestigious structures, the latest of which is the Oresund bridge linking Sweden with Denmark (Editor's note: see article on page 28 for more details). Rescon Mapei products were chosen for the membrane between the cement and upper layer.

Robust, level floors

The Rescon Mapei product lines (thermosetting compositions, cement-based specialist mortars, and additives for cement) are also widely used in tradition building. "I would like to stress that we are also concentrating on flooring products. These are very much in line with our business concept which is aimed at producing products and solutions that give our customers added value and reduce their outlay."
A fact often overlooked is that flooring plays quite a substantial economic role for many companies and that it affects safety and the production flow.



Rescon Mapei flooring products are mainly based on epoxy, polyurethane, and acrylic thermosetting compositions, which cover a wide range of uses. They can be prepared to offer various levels of mechanical, chemical and heat resistance and with specific anti-static characteristics, for example, or for various applications.
Other cost-cutters include self-levelling products which are used as a base for tiles or other finishes.
"They are applied by a pump cement mixer with a capacity of over 2,000 m^3 in eight hours. That's a very highly efficient method of floor-installation," says Hagerud.
Rescon Mapei has been involved in the flooring sector for many years now, supplying products developed by its own R&D Centre. It is often asked to do trouble-shooting too. Rescon Mapei's market share is in direct proportion to the difficulty of the projects involved, reaching almost 50% in the chemical industry. Major reference points are Norsk Hydro and the SAS hangars at Gardermoen Airport.

ISO and EMAS certification

Attention to quality has always been a major factor for Rescon Mapei and it welcomed the quality systems introduced at the beginning of the 1990s. In 1994, the Norwegian company received its first NS-EN ISO 9001 quality certificate which covered the whole spectrum of the company's activities (R&D, production, sales). In 1997, the certification was reissued.

One of the pioneers in Norway, Rescon Mapei was one of the first firms to receive EU approval for its application of the eco-friendly EMAS principles, which also corresponds to the ISO 14001. Rescon Mapei solutions for wet environments and swimming pools all comply with the very strict Norwegian standards.

A win-win situation

MD Trond Hagerud is very optimistic about his company's entry into the Mapei system and the mutual respect and good will. He says: "This is more than just a buy-out. It is a co-operative merger which will be to the advantage of both parties. We will improve our know-how, broaden our product range, and expand our markets together. This is a win-win situation which can only add to the intrinsic value of both companies."

Rescon Mapei, a caring company

As the leading company in a small community in eastern Norway, Rescon Mapei is much more than just a workplace to its employees. Absenteeism at Rescon Mapei runs at just 1.5%, a truly encouraging figure that is well below the Norwegian average. Managing director Trond Hagerud feels that this is the result of a policy of inclusion, team spirit, and clear, effective communication. Everyone who works at Rescon Mapei is involved in a plan to develop the skills of the individual, encompassing company values, professional capabilities, and general training. The programmes are run by the Rescon Mapei school, which has the company MD as its "headmaster", and in direct collaboration with the school authorities and the labour market.
The workers' well-being is also catered for by the Rescon Mapei Club. The Club organises parties and excursions, often including the staff's children and other family members. In order to provide the best possible introduction to Mapei, the Rescon Mapei management team and the Rescon Mapei Club invited all of the staff to visit the multinational's general headquarters in Milan. As a reference

Production staff

Dr Roar Myrdal of the R&D laboratory

The technical staff

Tunnelling technical support staff with a shotcrete injection plant

The Oresund Connection (The article on page 28 gives details of this prestigious project)

The sales team

A Resconsult man scales the walls of an oil platform

company, Rescon Mapei has a very warm relationship with the local community and authorities. In the spirit of this sense of belonging, Rescon Mapei also sponsors the local cycling team, speed skaters and ski jump athletes, all of whom have reached national and/or Olympic level.

Resconsult

Founded as an affiliated company in 1983, Resconsult is renowned within the sector for its avant-garde skills. The consultancy company is much sought-after in the field of specialist cement building and maintenance work. Fully owned by Rescon Mapei, Resconsult's typical customers are oil companies needing to do platform maintenance, road authorities needing to build or maintain bridges and tunnels, and private builders. Resconsult has 25 highly specialised employees and an annual turnover of 2.3 million Euros.

Rescon Mapei

Founded: 1997
Headquarters: Nord-Odal, Norway
Employees: 107
Turnover: 37 billion Lit. (1999)
Product lines: Rescon Mapei supplies products for the following sectors:
1) underground and large-scale projects
2) building
3) cement industry
4) industrial flooring
5) concrete repair
6) ceramic tile-linstallation

MAPEI REORGANISES IN SWEDEN TOO

Following the acquisition of Rescon, Mapei reorganises the new sales and production plant for the Scandinavia-Denmark region

Mapei MD Giorgio Squinzi explained the way in which the firm had been reorganised since the acquisition of Norwegian company Rescon. The reorganisation came with a very clear message: Mapei takes a long term view and so considers its current investments in Scandinavia as paving the way to making the Group the leader in the whole Nordic area. But let's take a closer look at the changes that have been made. Between 1997 and a short while ago, Mapei was operating commercially in Scandinavia through Mapei Scandinavien AB. However, the acquisition of Rescon in Norway with its specialist large-scale building products and know-how in the area of bridge and underwater tunnel building, has led to the launch of a new manufacturing and sales structure. This is headed by two companies, Oslo-based Rescon Mapei AB which produces and sells in Norway under the leadership of Trond Hagrud, and Stockholm-based Rescon Mapei AB led by MD Sture Sunden, which deals with sales and technical services in Sweden, Denmark, and the Baltic States. Sunden remarked that: "Adapting the production systems to the conditions in the North was an important step in the Mapei Group's globalisation process. The acquisition of Rescon makes us more complete and competitive and gives us a tool that will help us become a stronger presence on the Scandinavian building market. The guarantee of supplying the alkali-free concrete setting accelerator Mapequick AF 2000 for the shotcrete used in various blocks of Stockholm's Sodra Lanken tunnel has given us a very encouraging start.

PORTFOLIO

Some of the sites at which Rescon Mapei products have been used:

The Oslofjord Connection

The "Troll" cement oil platform

Dancall Telecom - anti-static flooring

Orebro tower-tank

Gordermoen Airport, Oslo

Oresund Connection

THE LAY OF THE LAND CHANGES

IN NORTHERN EUROPE

Rescon Mapei products played their part in the Oresund Connection. The huge structure consisting of 16 km of tunnels, bridges and an artificial island, opened on July 1 2000, linking Sweden and Denmark - also Rescon Mapei products were used.

The Oresund Connection, which links Copenhagen in Denmark and Malmo in Sweden, consists of sixteen kilometres of tunnels, suspended bridge spans and an artificial island. The decision to build the Connection was taken in 1991, work began in 1995, and it was officially opened on July 1 2000, having cost around 7,000 billion lire. It is the 10th longest construction of its kind in the world and consists of an artificial Danish peninsula (430 metres), an undersea tunnel (5,510 metres), an artificial island (4,055 metres), and a bridge (7,845 metres).

The Oresund Connection also includes a double-track railway and a four-lane motorway. It may be crossed on foot, by bike, car, or train. It is estimated that in its first year, the Connection will be used by an average of 12,000 cars each day. Each car will pay a fee of around Lit. 60,000 while buses will pay 250,000. The bridge should pay for itself within 27 years. "The most difficult thing was to comply with the very strict environmental impact restrictions that the Swedish and Danish governments imposed on us, especially where the construction of the artificial island was concerned," says Jacob Vestergaard, the man who led the building of the bridge. "We had to guarantee that the flow of water between

Photo Olympia

July 1 2000: the opening of the Oresund Connection. Prince Frederick of Denmark and Princess Victoria of Sweden meet at the halfway point on the bridge which links their two countries.

Photo Olympia

A view of the 7.8 km Oresund bridge which links Sweden and Denmark. It opened to traffic on July 1 2000.

Below, the underground stretch of the new tunnel.

the Baltic and the North Sea would not be affected and so we had to dig out the same volume of earth as we put in for the various foundations." The opening of the Oresund Connection has made Europe a bigger place. Like Britain on the advent of the Channel Tunnel a few years ago, Scandinavia now finds itself much less isolated. And with the building of a bridge across the Strait of Messina, it is now possible to drive all the way from Trapani to the North Cape overland. Or drive from London to Moscow, via Paris, Frankfort, Warsaw and Moscow.

A larger Europe also changes the geopolitical centre of gravity of the continent, with Germany, point of convergence of the East-West and South-North axes, taking pride of place once again.

Rescon Mapei's contribution to the construction of the Oresund Connection began in 1995 when it began developing epoxy materials suitable for the bridge on behalf of Dab Domifle AB, a Swedish company specialising the manufacture of different types of asphalt and the main asphalting contractor for the bridge. Naturally enough, the epoxy-based membrane had to meet the Swedish standards. And the Rescon Mapei solutions were actually sent by Dab Domiflex AB to the Swedish Road Authorities Laboratories (VTI) for evaluation. The material was given the following names: Beta R Epoxy, Beta R Epoxy Tix, Beta Primer for steel, and Beta Primer for cement.

Research and development on the cementitious primer began in 1997 in collaboration with the Swedish laboratories. And since the Swedish standards for this material are based principally on German and Danish regulations and standards, over 100

solutions were tried over six months in the Rescon Mapei laboratories. In the end, 10 were sent to the VTI for testing. In March 1999, the product passed the final test and production began. In the space of just a couple of months, 80 tons of Beta Primer for cement were sent to DAB in a 1,000 containers, all for use on the Oresund Bridge.

The epoxy material was applied using a special treatment. Two layers of around 0.7 kg/m² per layer were applied with dry sand quartz sprayed over each layer.

The Oresund Connection consists of a long bridge and a tunnel. The tunnel is made up of 20 178-metre long prefabricated sections. Each prefabricated section in turn consists of eight elements, each 22 metres long, 8.5 metres high, and 42 metres wide During the project, these huge elements had to be moved along a series of 400 metre slips.

To reduce friction, a steel plate was initially bond to each skid. This system did not work as well as it should have and Rescon Mapei was contacted to trouble-shoot the problem.

The solution it came up with was to remove the steel plates from the skids which were then treated with Epoxy LL primer sprayed with quartz sand to improve adhesion to the next layer. A layer of Rescon Epoxy L (3 kg per m²) was applied over the primer. This layer was levelled as required and the cement structures slid over the epoxy product. When the prefabrication work was finished, the skids were checked and there wasn't even the tiniest hint of abrasion on the epoxy surface. A French company involved in the work, GTM, even went on to use the Rescon Mapei solution on two other occasions: in building Disneyland in Paris and for a bridge in Great Britain.

Other Mapei products were also used in the building of parts of the imposing Connection. They were selected, years before the Rescon take-over, in what was considered to be a dry run for the Oresund Connection: the building of two three-lane each way bridges in the Store Baelt Channel which opened in 1998. These were the West Bridge which covers the tract between the Danish peninsula and the small island of Sprogo, and the East Bridge, which, at 1,624 metres, is the second longest bridge in the world suspended between two concrete piers and links the island of Sprogo with the island of Zeeland. The products used were Mapefill and Mapelastic.

DURABILITY

The life expectancy of reinforced concrete, used in projects of architectural or socio-economic importance, is around one hundred years

by Mario Collepardi

The durability of modern reinforced concrete structures seems unsatisfactory when compared with the life of ancient works where non-reinforced concrete was used, such as the Pantheon in Rome or the Pont du Gard, near Nîmes in France[1]. If normal durability is required – say around 50 years as outlined by the directives – this objective is realistic in the light of current knowledge, as represented by the European directives, (EN 206, for example, or Eurocode 2). However, where infrastructural engineering works of great socio-economic interest (motorways, aqueducts, large bridges, galleries, airports etc.) or works of great architectural significance (like churches, museums, theatres, public buildings in general) are concerned, a useful life of 50 years is totally unacceptable to the general community. In such cases, "long-term durability" is a factor even at the planning stage. Although this term crops up frequently in international technical literature, as yet there is no general consensus as to how long the service life of structures with long-term durability should be. There are certainly many renaissance structures or bridges constructed in Italy centuries ago that fall into this category. For the sake of simplicity, we can accept a convention of at least 100 years of useful service life for structures with long-term durability[2].
So, for this type of reinforced concrete infrastructural or architectural engineering project - also intended to defy the passage of centuries, if not eternity – it is not enough simply to respect the above-mentioned directives. In fact, consideration must also be given to the intrinsic vulnerability of the steel rods in reinforced concrete structures, resulting from a series of interactions between their interdependents[3].

a) low tensile strength associated with the high modulus of elasticity of reinforced concrete;
b) microfissures in the concrete cover (caused by hygrothermic excursions in the environment, and stress in use) resulting from the characteristics of reinforced concrete mentioned in a);
c) easy access for aggressive agents in the environment (O_2, H_2O, CO_2, Cl etc.) through the microfissures, and encouragement of steel corrosion, even in low porosity, high-quality reinforced concrete with a low water/cement ratio;
d) transformation of the microfissures into macrofissures resulting from oxidisation of the rods and expulsion of the concrete cover;
e) exponential acceleration of corrosion as a result of direct exposure of the steel to aggressive agents in the environment. In other words, it should be noted that, for reinforced concrete structures designed following criteria of long-term durability, all this is not enough. Not because of the reinforced concrete per se, but rather as a result of potential corrosion of the reinforcing rods.

Figure 1 – following a diagram proposed by Mehta[3] - shows the degradation mechanism and the role played by capillary porosity, the relationship with the quality of the cement matrix (and the water/cement ratio used in the mix), and the transformation of microfissures into macrofissures. Capillary porosity is determined by ordinary durability; the presence of microfissures and their transformation into macrofissures have an influence on long term durability.
The two underlying factors in the deterioration of reinforced concrete structures are:

- ignoring current technical know-how regarding ordinary durability (50 years of useful service life);
- the intrinsic vulnerability of the steel reinforcing structure in long-term durability (at least 200 years of useful service life).

We can emphasise that the first factor - human negligence - includes the choice of a poor water/cement ratio, an unsuitable type of cement, aggregates that are inappropriate as a result of their reactivity with alkalis, and a reduced concrete cover with respect to the level of environmental aggression (carbonisation and/or exposure to chlorides).

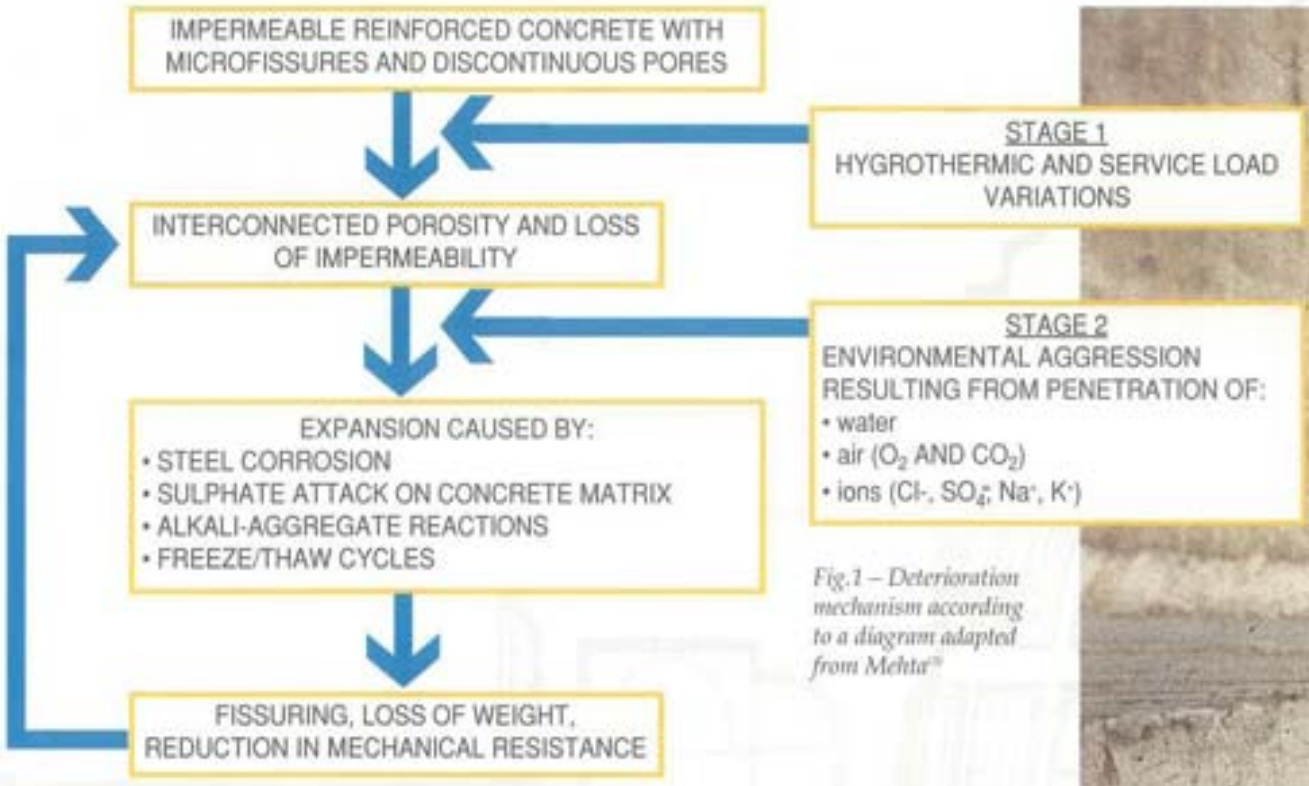


Fig.1 – Deterioration mechanism according to a diagram adapted from Mehta[3]

The second factor relates to the fact that reinforced concrete – because of its excessive rigidity and modest tensile strength – is a material with high crack sensitivity when exposed to the stresses imposed by environmental thermo-hygrometric variations and dynamic service loads.
We will take a more detailed look at the human negligence factor – in other words, those rules of good building that, if ignored, lead inevitably to deterioration of the reinforced concrete structure.
These rules specify:

- Suitable assessment on the part of the designer of the R_{ck}, durability and a concrete cover thickness in line with Eurocode 2, according to the nature of exposure.
- The choice by the reinforced concrete producer of suitable raw materials - cement, sound, well-assorted aggregates and chemical additives.
- The adoption by the reinforced concrete producer of a suitable mix, to satisfy the requirements of R_{ck} and durability (exposure class) specified by the designers.
- Care on the part of the company in carrying out casting and compaction of the fresh reinforced concrete, and in the moist curing.

It can be seen that rules do exist for everyone involved in the project: the designers, the reinforced concrete producers, their raw material suppliers, the company and its works manager, who should verify that the materials supplied match the design specifications, and ensure work is carried out correctly in terms of preparing the structure for service and curing of the concrete.
So there are rules, and they should all be respected: just as on an assembly line, all it takes is one worker doing shoddy work for the product as a whole to be faulty – in other words, not durable. At home in Italy, it's tempting to attribute this kind of negligence to the usual Italian attitude that rules are made to be ignored. But the problem is a little more complicated than that, as the issue of durability in reinforced concrete structures is also a subject for concern in countries like the USA, Great Britain, Germany and Japan, all of which enjoy a reputation for strict adherence to the rules.
An analysis of this situation involves the intrinsic complexity of reinforced concrete constructions (with all the different contractors), and the problems of adequate training and keeping knowledge up-to-date inherent in a discipline in a state of constant evolution, especially over the last thirty years.
We will limit ourselves here to mentioning two factors that influence the durability of reinforced concrete constructions. Both have an influence on the impermeability of the material in the face of aggressive environmental agents, especially where steel reinforcing is

concerned. These factors are the water/cement ratio and wet curing.
A low water/cement ratio (0.45-0.55) would lead to casting difficulties, as a result of the mix's low level of workability. In this case, fluidifying or superfluidifying additives, especially if they are capable of helping to retain initial workability during transport of the reinforced concrete, now allow a low water/cement ratio – indispensable for durability – to be used while retaining ease and rapidity of use on site.
Wet curing is perhaps the most neglected factor. Nevertheless insufficient curing (in a dry and ventilated climate) in structures, where forms have been removed prematurely, causes drying out of the sections of the structure most exposed to the environment, with the consequent halting of the hydration of the cement and superficial cracking. In other words, it is in the concrete cover – which by definition fulfils the role of protection for the steel reinforcement – that the defects responsible for the deterioration of the structure are concentrated. In this case, too, the directives suggest a technical solution, as an alternative to a delayed removal of forms (around seven days), or the permanent application of a water spray for an equivalent period, this solution taking the form of an anti-evaporation membrane created by the spray application of the curing agent on the structure where forms have recently been removed.

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Grand Hotel QUISISANA

The building and waterproofing of two swimming pools adds a perfect finishing touch to the splendid setting of one of the world's most exclusive hotels, the Grand Hotel Quisisana on the isle of Capri.

by Giuseppe Puttini

Beloved of writers, painters, intellectuals, exiles, the rich and eccentric, Capri has attracted a flood of picturesque visitors and residents since the end of the 19th century, making it famous throughout the world. Inhabited since the Palaeolithic era and then ruled by the Greeks and Romans in turn, the lovely island is also renowned for its enviable position in the southern part of the Bay of Naples and, of course, its seductive natural beauty. In fact, the small island boasts a vast range of plant species - 850 in all with 130 varieties. The Grand Hotel Quisisana lies in the very heart of this splendid natural setting and was named by its founder, George Sidney Clark, in honour of the island's mild, Mediterranean climate (temperatures range from +10° C to +24° C). Clark was a Scottish doctor who arrived on Capri in the mid-1800s and decided to settle there, opening a clinic in one of the most sheltered and sunny corners of the island,

as he was convinced that the environment would be most beneficial to the health.

The hotel was built on Via Camerelle, now one of Capri's most elegant shopping streets. It is difficult to believe that during Roman times, there was a succession of kilometre-long tanks along this street, almost certainly used to terrace a road. The inside of these tanks acted simply as water receptacles: "...the supporting arches on the San Michele road form chambers towards the mountain which are given the same name of *Camerelle*" (from Virgil Book VIII).

During the Middle Ages, these tanks were gradually opened and faced the modern street. They were used at that time as storehouses. The first houses built around them include the Hotel Quisisana and the Villa Pompeiana which date back to the mid-19th century.

At about that time, Capri began to attract growing numbers of tourists and little by little Clark's sanatorium became more of a *pensione* than a clinic, until even Clark himself had exchanged his white coat for a frock-coat.

The hotel was later extended and a large west wing was added. During the excavation work, the bones of a huge elephant from the Quaternary era were found, proving that animals from the mainland had found their way to Capri when it was still connected to the Sorrento peninsula.
The extension work coincided with one of the Quisisana's golden moments as the nobility of the day flocked to holiday in this lovely jewel of a building set on the colourful, perfumed Mediterranean isle.
One of the Hotel's most illustrious guests at the time was Friedrich Krupp, the German steel magnate, who built the famous Via Krupp so that he could have a direct link between the Quisisana and the yachts tied up in the Marina Piccola.
In the mid-1970s, the Hotel was sold to Max Grundig, the German electrical appliance magnate, who also made some improvements. He sold it in 1981 and the Hotel became the property of a Capri family, the Morganos, for the first time.

A tradition of quality

The Morgano family too improved the services and facilities available to their illustrious guests which now numbered royalty, actors, writers, industrialists, and singers. It would take forever to list the famous people who have stayed and continue to stay at the Quisisana. Suffice to say that in 1986, the Hotel became one of The Leading Hotels of the World, an exclusive organisation with extremely high and rigid standards of quality. In fact, in order to comply with these very high quality standards and to offer their guests a little something extra, the Morganos decided to build a new indoor swimming pool and renovate the existing outdoor one.
The work on the two pools was carried out at different times, but great care went into the construction techniques, improvement, and waterproofing of both.

Waterproof and tough

One of the most important characteristics that any pool or water tank must have is the capacity to contain water without leaking, i.e. it must be waterproof. If it is not, it could cause severe damage and an unwelcome hike in management costs, so naturally due consideration was given to this aspect for the two Quisisana pools.
In both cases, the work included laying waterproofing between the substrate and the foundations. The indoor pool (photos 1 and 2) was built between 1991 and 1992. After the concrete foundation had cured sufficiently, NIVOPLAN mixed with 50% PLANICRETE and water was used to level out the walls and concrete bed. NIVOPLAN is a mixture of cement, selected aggregates and special synthetic resins which, once set, form a compact water and frost resistant render. Mixing it with PLANICRETE, a synthetic rubber latex for cement mixes, improves its plasticity, water retention, and general workability.

IDROSILEX PRONTO, a ready to use cement mortar moisture barrier, was used to waterproof the pools, although an even more suitable product, MAPELASTIC, has since been developed. Despite the fact that IDROSILEX PRONTO was not the most suitable product for this particular task, it is still doing the job and guaranteeing a very impressive standard of waterproofing in the pools. The laying of a ceramic mosaic to finish the pool was carried out using one of Mapei's most tried and tested combinations: KERABOND mixed with ISOLASTIC. This system, developed in the Mapei R&D laboratories, consists of a cement, selected sands, synthetic resins, and special additives plus an elastic latex for cementitious adhesives.
The mosaic joints were created using KERACOLOR FINE + FUGOLASTIC, a system consisting of a prepacked cement mortar for joints of between 0 and 4 mm, combined with a special synthetic latex-based admixture to ensure excellent mechanical resistance and a good waterproofing.
Finally, to seal the expansion joints, a single-component solvent-free acetic-crosslinking silicone sealant MAPESIL AC was applied over a silicon seal primer PRIMER FD. MAPESIL AC reticulates with atmospheric humidity at room temperature to form an elastic product capable of withstanding bad weather, industrial environments, and temperature swings for years. The outdoor pool, which had been built some years previously, was in need of some structural and aesthetic modification. Its bottom was raised thanks to the addition


PHOTO 1


PHOTO 2


PHOTO 3


PHOTO 6

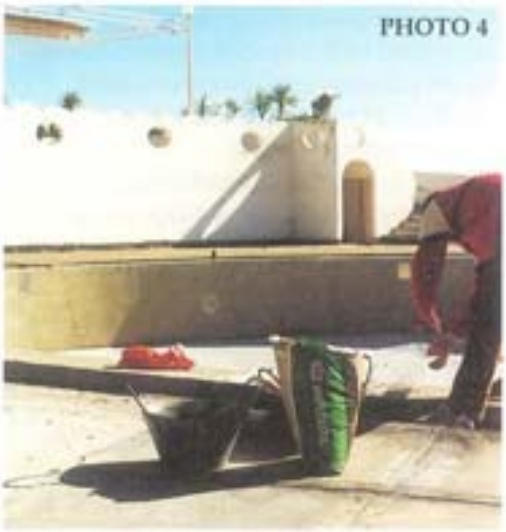


PHOTO 4

carried out using MAPELASTIC reinforced with fibreglass mesh (photo 4). The latter is a two-component flexible cement mortar which guarantees waterproof protection for concrete and resulted in a flexible yet waterproof layer. Formulated in the Mapei Research and Development Laboratories, MAPELASTIC offers excellent adhesion to all concrete surfaces and brickwork thanks to a high content of quality synthetic resins. The ceramic tiles were installed using GRANIRAPID (photos 5 and 6), a fast-setting two-component adhesive system with rapid hydration for use on ceramics, and natural and artificial stone which also offers extraordinarily good adhesion. This system is therefore particularly useful for surfaces which have to be completed in a


PHOTO 5

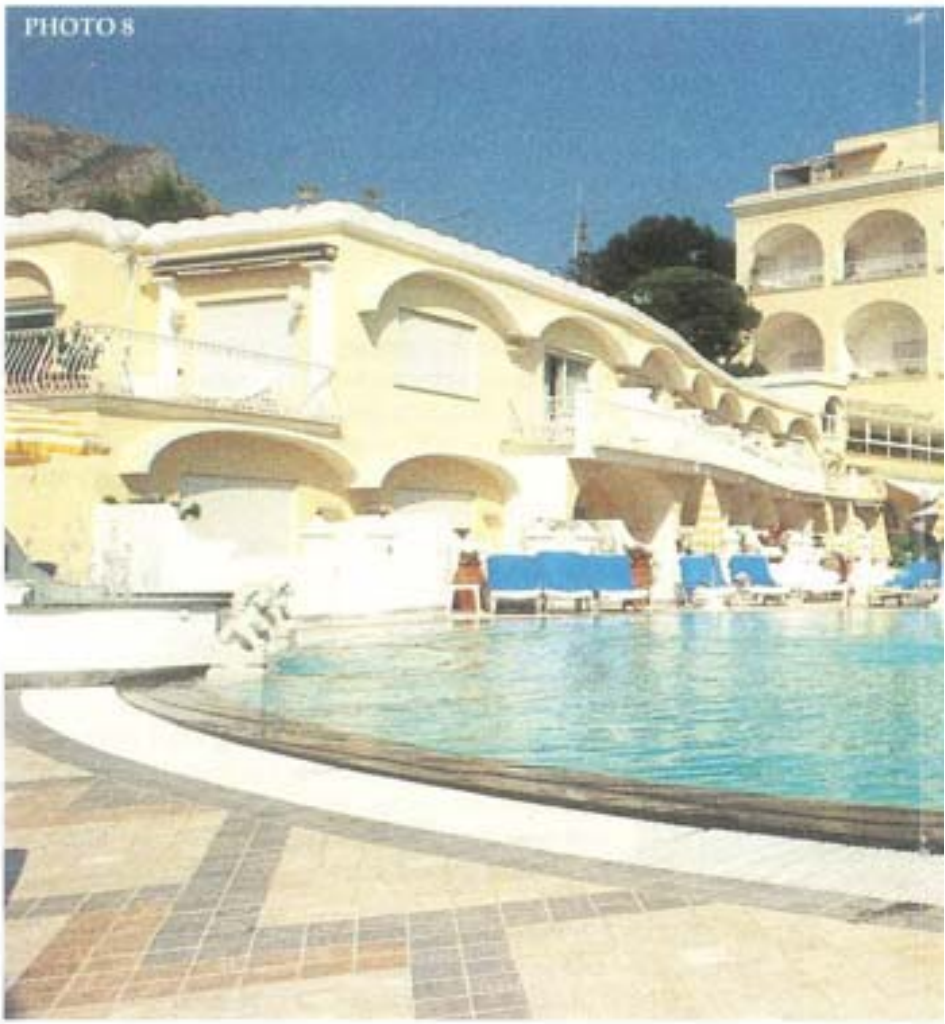


PHOTO 8

of a screed to suit the needs of the Hotel's mostly American clientele, while the old mosaic was removed from its curved sides and the whole structure was improved to meet the regulations in force. NIVOPLAN mixed with water and PLANICRETE (50%) was then applied to the sides (photo 3). This leveling was also necessary to level out the bed and fill in the depressions inevitably made during the installation of the screed. The waterproofing was


PHOTO 7

hurry for immediate use. In this case, the Project Managers took the time to carry out load tests and GRANIRAPID met the necessary requirements in full. The grouting here was also carried out using KERACOLOR + FUGOLASTIC (photo 7). The correct use of the products involved combined with carefully judged choices and valuable technical advice in situ, have ensured that the swimming pools at the Hotel Quisisana have had a real makeover that will surprise and delight its guests.

The technical Data Sheets of the products mentioned in this article are contained in Mapei binder no. 1, Ceramics Line.





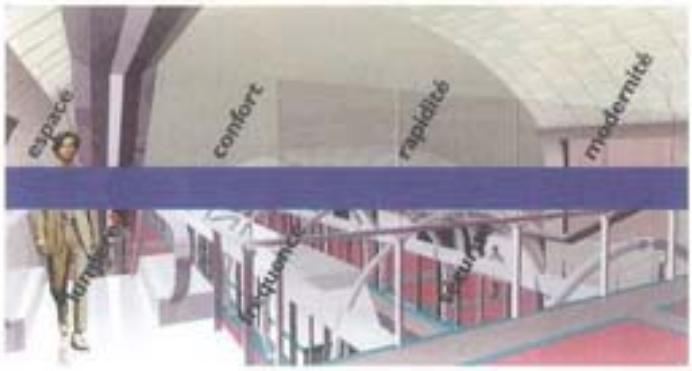



TECHNICAL DATA

Grand Hotel Quisisana - Capri (NA)
Hotel built: mid-19th century
Indoor pool built: 1991-1992
Tiling company used for indoor pool: Edilpas di Pasqualini Rolando (NA)
Outdoor pool renovated: 1998
Company used: Edi.so.r Porta Srl - Capri (NA)
Project director: Gaetano Porta
Covering material: ceramic mosaic

INDOOR POOL
Mapei products used for the substrate:
NIVOPLAN + PLANICRETE
for waterproofing:
IDROSILEX PRONTO
for installation of mosaic:
KERABOND + ISOLASTIC
for mosaic grouting:
KERACOLOR + FUGOLASTIC
for filling joints:
MAPESIL AC + PRIMER FD

OUTDOOR POOL
Mapei products used for the substrate:
NIVOPLAN + PLANICRETE
for waterproofing:
MAPELASTIC
for installation of mosaic:
GRANIRAPID
for mosaic grouting:
KERACOLOR + FUGOLASTIC
Mapei co-ordinator:
Giuseppe Puttini - Soces, Naples

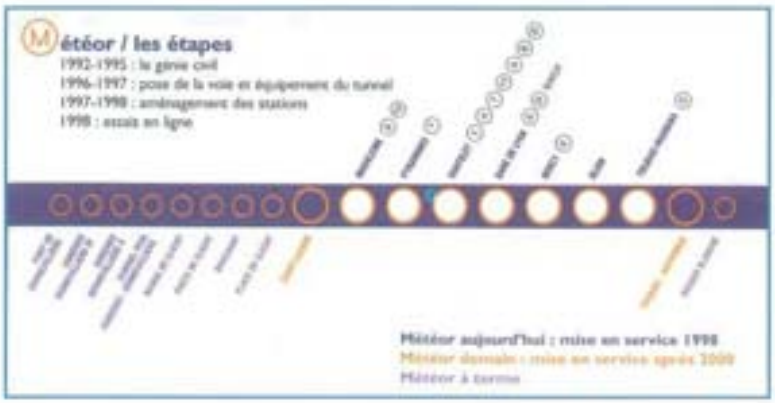


Automated, fast, futuristic: the Paris Metro's brand-new Line 14 can carry up to 40,000 passengers an hour. And it's driverless too.....

It could be a scene from Duel, the chilling film where a crazed driverless truck mercilessly hunts down a terrified car driver. Being tyrannised by an out of control machine was one of the great fears of the last century, a fear that has been exorcised once and for all by the Paris Metro's latest underground line.
75 years after the last metro was built comes the revolutionary Météor project (Metro Est Ouest Rapide) which has no driver at all. No human driver anyway. In fact, the metro carriages that link the Rive Droite with the Rive Gauche are actually driven only by a microchip embedded in an electronic brain, which is capable of synchronising the stops and warning of any breakdowns or problems.
Opened on October 15 1998 by Jacques Chirac, this formidable system runs through a new tunnel along the Seine and boasts very high standards of quality and safety. And it looks very, very good too. Financed by seven billion Francs from the public purse, the Météor covers the seven kilometres between the Madaleine and the new Bibliotheque François Mitterand in just 12 minutes. The trains, designed by Roger Tallon, the man behind the TGV, do not have separate carriages, but consist of one long aluminium passenger car which, thanks to the fact that it doesn't have a driver, allows passengers a glimpse of the tortuous tunnel as they fly through it.

Sorry to get there

This avant-garde piece of technology clashes somewhat with the



old metro which dates back to 1900. Ultramodern granite walls and comfortable steel and wood seats stand out beside the famous cast iron and glass entrances designed by Hector Guimard for the World Fair. Each is a creature of its own time, taking us on a journey through time as well as space and bearing witness to the rapid technological developments that took place between the start of the last century and the threshold of the third millennium.
As the world's first automatic line capable of carrying up to 40,000 passengers in one direction in a single hour (as compared to the normal 10,000), the Météor is part of a wider project which will see it extend south towards Les Olympiades to improve the transport network in the 13th arrondissement, one of Paris's most densely populated areas. Naturally enough, the new technological miracle immediately attracted the attention of the locals. In fact, for its inauguration, RATP, the Parisian Transport Body, invited the city's citizens to abandon their cinemas and museums to admire the latest addition and its Bernard Kohn-designed stations, free of charge. Designed as part of "a project which included a social, almost political, aspect, in which the metro, a place through which men and women from every stratum of society pass, becomes an art form, a piece of design, a piece of entertainment," the stations are made from avant-garde, graffiti and vandal-proof materials, such granite, polished cement, steel and synthetic resins, all flooded with soft, warm light. The wonderfully silent trains are complete with onboard video surveillance and zip along on their rubber tyres at 40 km/h (as against the 20-25 of the normal metrò),


PHOTO 1


PHOTO 2

arriving at the stops every two minutes. The special revolutionary remote controlled automation system or SAET was developed by Matra Transport International.
The new line also symbolises cultural activity. In fact, back-to-back programmes offer passengers pleasant snippets of entertainment, with a guaranteed 30 events per year. The National Contemporary Art Fund is also in charge of managing a series of temporary exhibition spaces. The walls are adorned with a veritable constellation of greetings in all of the languages of the world, all with one message: welcome.

Comfort and safety

The stops were designed to offer


PHOTO 3


PHOTO 4


PHOTO 6

passengers the kind of comfort and safety features they wanted, such as bright spaces, larger platforms, and pleasant surroundings. By day, each station is characterised by a triumphant, beautifully-lit 25-metre high space in


PHOTO 5

which a "metal serpent", a suspended passageway built by the Eiffel Company, carrying electricity cables, video cameras, and lights, guides passengers from the mezzanine to the platforms.
In order to prevent accidents and suicide attempts, the platforms on Line 14 are protected by transparent Plexiglas doors which only open as the train arrives, offering a very high standard of safety. All taken care of by 240 virtually invisible employees who work almost round the clock from five a.m. until one a.m. to ensure that everything goes smoothly. The architects in charge of the project have decorated Line 14 very creatively indeed and designed the stations using high quality, low maintenance, vandal-proof materials. Of the total of seven stations, six were floored with reconstituted marble installed using GRANIRAPID, KERAPOXY P, and MAPEFLEX PU21, all very technologically advanced systems.

A fast, quality finish

In order that the stations could go into service immediately and be able to cope with the 62,000 passengers per hour that would pass through them, over 17,000 square metres of 30X30 and 60X60 cm marble was installed using GRANIRAPID, a fast-setting two-component shrinkage-free system with rapid hydration which also offers excellent adhesion to all the most difficult substrates, plus good resistance to impact, vibration, temperature changes, wear and tear, and dilute chemical agents (photos 1

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and 2). Because of the restrictive nature of the project which required joints to be filled with an exceptionally adhesive product with top class chemical and mechanical resistance which would also be easy to clean and work with at low temperatures, it was decided to use KERAPOXY P, a two-component, acid-resistant epoxy sealant (photo 3). The expansion joints were sealed using MAPEFLEX PU21, a two-component, self-levelling polyurethane compound which once dry (i.e. within around 24 hours), becomes elastic and heat and water-resistant (photo 4). MAPEFLEX PU21 also offers excellent mechanical and scratch-resistance properties. It remains almost unaffected by a wide range of temperatures (-30°C-+80°C). The combined KERAPOXY P and MAPEFLEX PU21 system guaranteed flooring that was also highly resistant to static electricity and the associated phenomena. The Météor rapid transport system stations also offered us the perfect opportunity to perfect our products and processes and thus contribute to rapid technological progress (photo 5 and 6).

The technical Data Sheets for the products mentioned in this article can be found in Mapei binder no. 1, Ceramics Line.

TECHNICAL DATA

Météor (Metro Est Ouest Rapide): Paris (France)

Year: 1998

Commissioned by: RATP (Parisian Transport Body)

Design and direction: Bernard Kohn, architect

Materials: Reconstituted marble (30X30 and 60X60 cm), Quarella

Marble-installation products:
GRANIRAPID
KERAPOXY P
MAPEFLUX PU21

Tile laying company: Kuhn de Troyes

Mapei co-ordinator: Philippe Latrace

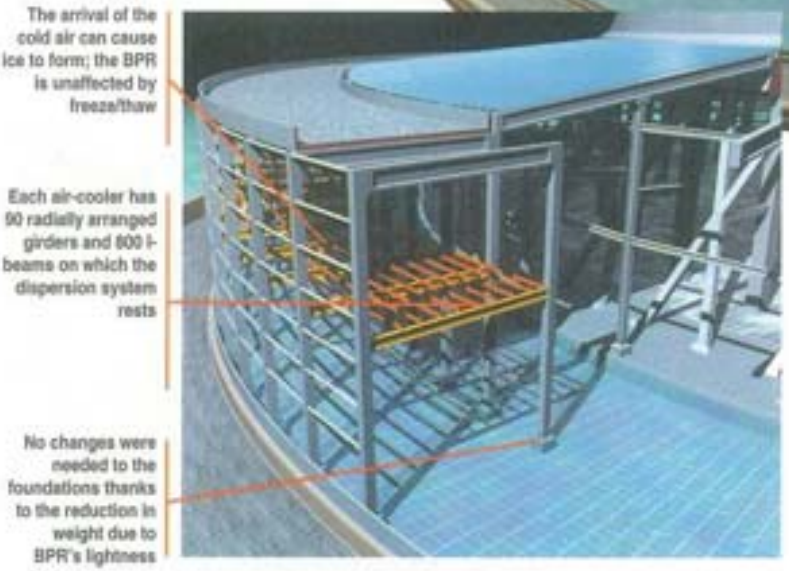
A YOUNG réactives

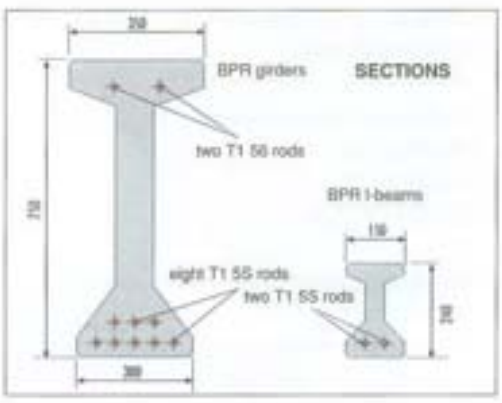
Changes were made to the BPR formula (Béton de Poudres Réactives), a reagent powder-based concrete invented in 1992, for the renovation of the Cattenom nuclear power station in France. The new addition? An acrylic hyperplasticiser.

Despite the fact that it has now been around for eight years, BPR, the reagent powder-based concrete patented by Bouygues, is still considered a very new material.
Its durability and lightness were the two qualities which convinced France's national electricity board, EDF (Electricité de France), to use it in its nuclear power stations. In fact, they ordered over 2,500 girders and I-beams made of BPR from Bouygues.

An aggressive environment

At Cattenom, BPR was used to renovate the nuclear power station's air coolers. EDF had planned to install high-performance concrete girders to support the existing structures which had unfortunately deteriorated prematurely. The decision to use high-performance concrete also reduced the overloading of the existing structures.
The job of this network of girders is to support the heat exchanger which ensures that the station's cooling circuit functions. It is thus constantly exposed to physical and chemical wear and tear (waste water, freeze/thaw cycles) which reduces the life expectancy of the structure. The use of these girders would therefore provide a tough skeleton, especially from a chemical point of view. This was particularly important because during winter, the structures inside the air-coolers are subject to continuous freeze/thaw cycles. Furthermore, the water from the cooling circuit is treated with chorine which makes the environment even more aggressive where concrete is concerned.





Three times lighter

For several years now, EDF has been endeavouring to use materials which boast improved durability to reduce maintenance costs. BPR's exceptional levels of water and freeze/thaw cycle-resistance made it an ideal choice for use in the replacement of the old girder system.

Its mechanical properties also meant that the weight of the structure would be reduced by two-thirds, meaning that the foundation work would prove less expensive too. The girders, radially arranged around the air-coolers, are 14 metres in length and each supports nine I-beams of between 6 and 6.9 metres in length. These components do not have any

Preparation of girders in the heat treatment area

passive reinforcement and are prefabricated at a rate of 20 per day.

Ready-to-use BPR

BPR is manufactured in a station equipped with a mixer with a high cutting power. After knocking out and when the rods have been cut, the girders are subjected to 48 hours of heat treatment at 90 degrees, after which the BPR's resistance increases to an average of 220 MPa. There is very strict quality control right the way through this industrial-scale production process. Everything from the choice of components to the warehousing is carefully controlled. BPR consists of five basic ingredients. Sand accounts for the largest granulated fraction (from 500 to 800 µm = from 0.5 to 0.8 mm), while crushed quartz (from 2 to 20 µm), and brown silica (5 to 1 µm) are the finest components. The cement (CPA-CEM I 52.5 PMES) has a classic screening line of 100 µm. "In this mixture of very fine ingredients, the brown silica and cement are reagents," says Regis Adeline, director of the Bouyges Laboratories. Finally, BPR also contains high resistance metal fibres with a diameter of 200 µm. This is a material that works in a different way to normal concrete and to which normal calculation rules do not apply. "BPR does not have any passive structure and this a very big advantage," explains Arnaud Bakaert, manager of the I-beam prefabrication project for the Cattenom station. "On the one hand, there is no point in creating a structural plane while, on the other, the shape of the mould is independent of the structure." This means that the thickness of the concrete can be kept to the absolute minimum possible, which is the same as that of the thickness of the concrete of the reinforcement.

A new generation

With a W/C ratio of 0.2, BPR is a sub-stoichiometric material. This means that the volume of water is not large enough to hydrate all of the cement. However, other chemical processes also affect the setting process, such as the brown silica reaction. BPR has fluid consistency with a slump of 25 cm, thanks to the addition of technologically advanced additives, such as MAPEFLUID X404 which was used in this case.

Despite the severe reduction in the amount of mix water, the use of this new generation hyperplasticiser has given BPR exceptional ductility, fluidity, and final mechanical strength to compressive stress (>220 Mpa).

Having mixed the components and added the MAPEFLUID X404 in the mix water, a mobile hopper poured the BPR into vibrating moulds in which the rods had been placed under tension. To cure the concrete, the mixture was brought to a temperature of around 40°C. The girders were then knocked out, heat-treated and transported to the Cattenom Nuclear Power Station for use.

The technical Data Sheets of the product mentioned in this article can be found in Mapei binder no. 4 - Admixture Line.

CATTENOM STATISTICS

Girders	270
I-beams	2,376
BPR volume	823 m³
Precompression	87 t
Output per week	100 units

TECHNICAL DATA

Cattenom Nuclear Power Station - France

Year: 1997-1999

Commissioned by: EDF (Electricité de Fance) CNPE

Technical support: EDF-SEPTEN, EDF CEMETE

Direction: Arnaud Bekaert

Main company: Hamon

Prefabrication of BPR for girders and I-beams: Bouygues TP

Testing: LCPC, CEBTP

Product used: MAPEFLUID X404

Mapei co-ordinator: Thierry Labat

The fineness of BPR's components result in a bubble-free finish

With thanks to Bouygues TP for supplying the photographs used

FLOORING screeds

by Mario Collepardi

Curling and Cracking

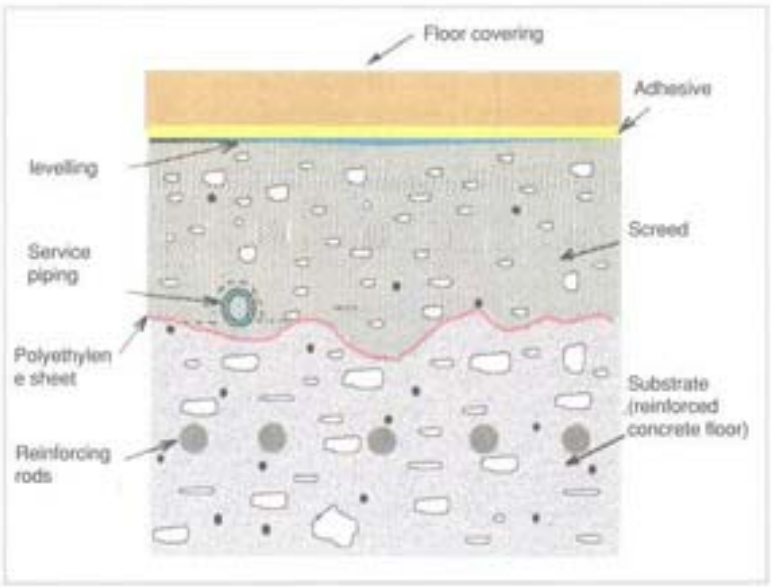
Flooring screeds can be defined as thin, layered structures of 4 to 8 cm, installed over a pre-existing reinforced concrete substrates (ceilings or floors). As the substrate surface is usually irregular, a covering must be used to obtain the required evenness. Another important function of the screed is to provide for the installation of service piping or cables installed on the substrate and embedded in the screed.

In general, the screed acts as an intermediate layer between the substrate and the adhesive, which is applied directly to the screed for the fixing of the final ceramic, stone, wood or plastic (carpet, rubber etc) covering. Sometimes, in order to eliminate inevitable defects in the screed, a fluid smoothing mortar – frequently self-levelling – is applied before the adhesive layer to improve evenness. This layer of smoothing mortar also serves to flatten and smooth the screed surface for resilient coverings.

Fig. 1 shows a cross-section of an area of flooring with the above-mentioned layers, including a polyethylene sheet acting as a barrier against the moisture that could otherwise migrate from the substrate into the screed.

For optimum performance, the screed should be smooth, dried and polished just before the adhesive is applied to fix the surface covering. It should also be dimensionally stable in relation to hygrometric conditions of use which, even in locations protected from the external environment, can involve the presence of water through rainfall, damage or accidental leakage from other sources, even if these conditions are sporadic and exceptional. Lastly, a screed should be reliable in terms of durability – in other words, it should not interact negatively with the substrate, the self-levelling mortar or the adhesive. Compared to other reinforced concrete structures, flooring in general and screeds in particular display

Fig. 1 Cross-section of reinforced concrete flooring.



several distinctive properties:

- considerable surface stretching in comparison to the thickness;
- exposure to air immediately following installation.

These characteristics make the flooring and the screed particularly vulnerable – in comparison to the rest of the structure – to two phenomena that typify cementitious conglomerates:

- hygrometric shrinkage;
- bleeding.

In contrast to many other construction materials, reinforced concrete contracts if the relative humidity (R.H.) drops below a certain level (approx. 95%). When this occurs, the water held in

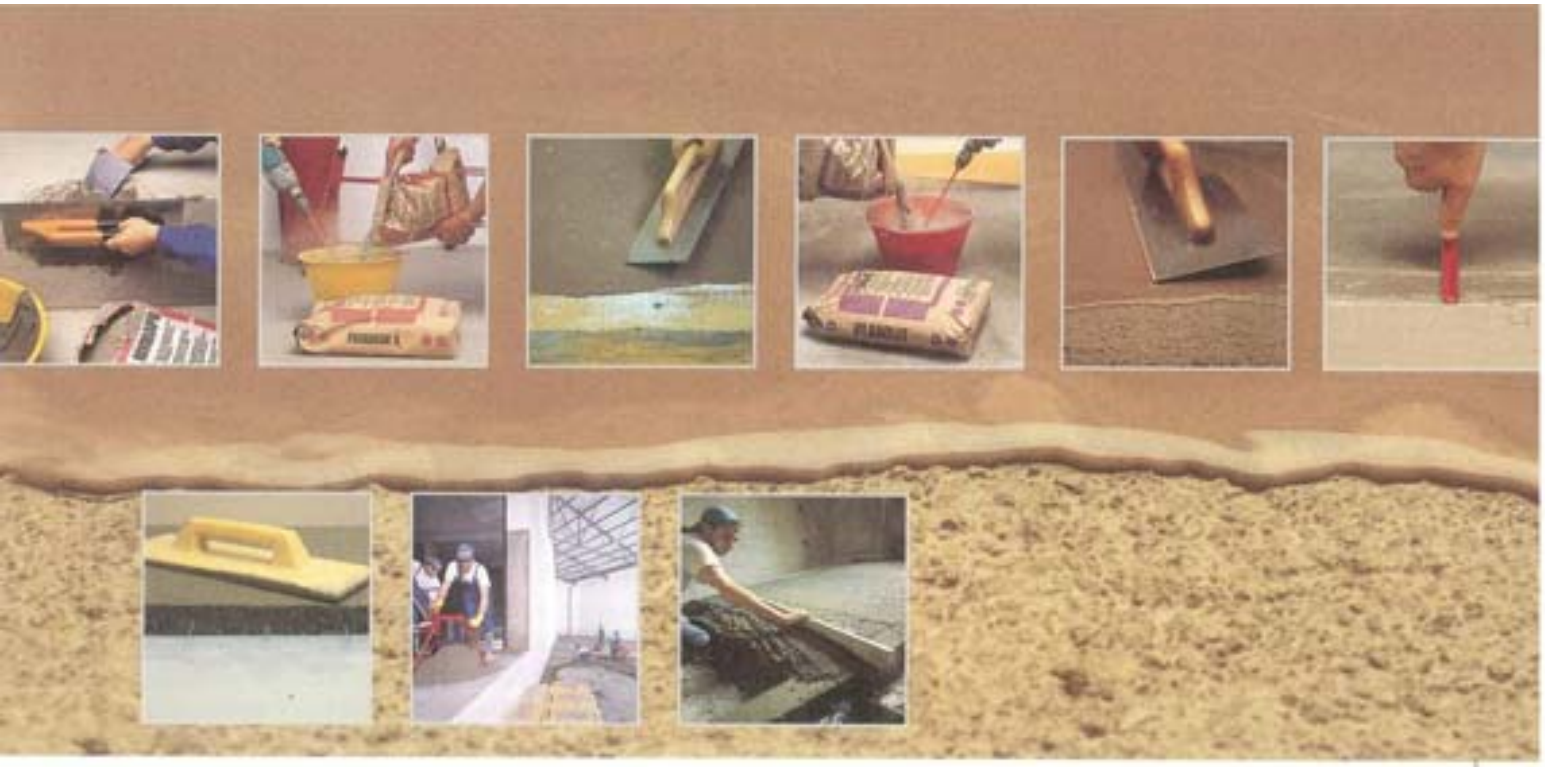


Fig. 2 Curling (A) and cracking (B) of a screed, without and with adhesion to the substrate.

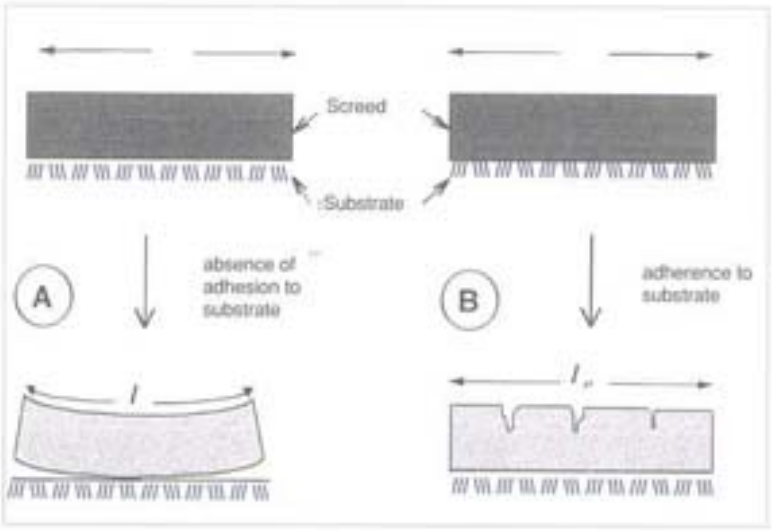
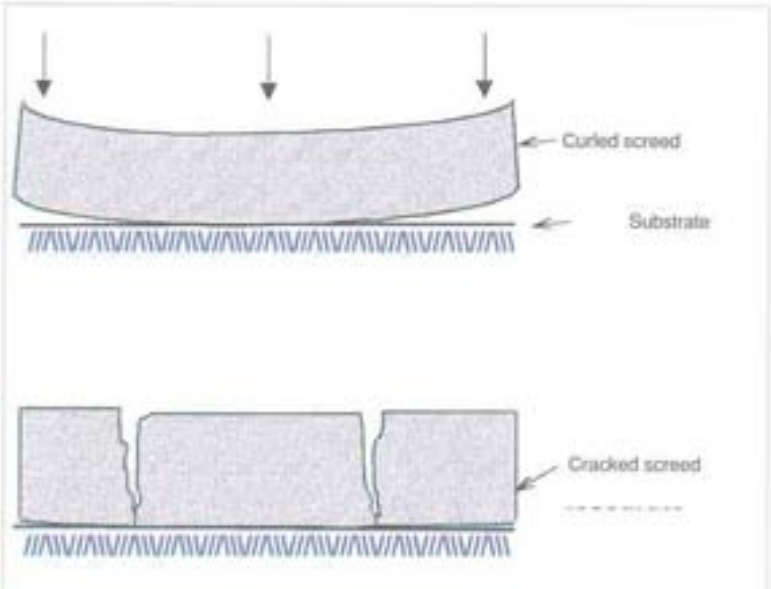


Fig. 3 Flexion rotation of the curled screed after subjection to service loads.



the reinforced concrete evaporates and the material shrinks. However, as evaporation does not occur uniformly over the whole structure, the shrinkage is differential. The results of this differential shrinkage are particularly clear in a structure – like a screed – of which the upper surface (exposed to the air) dries out and tends to contract, while the lower surface (protected from evaporation) does not undergo any significant shrinkage and remains stable. In the extreme, this difference in behaviour can result in two situations:

- curling of the screed, if there is no adherence to the substrate and the slab is free to lift (the result, for example, of the polyethylene vapour barrier) (Fig. 2A);
- cracking of the surface layer if adherence to the screed forces the lower surface to retain its initial dimensions (Fig. 2B).

In fact, service loads can cause curling to follow on from screed cracking, as a result of inconsistent contact with the screed (Fig 3).

Minimising shrinkage

In theory, there are two ways of reducing shrinkage and the cracking and curling it causes:

- keep the humidity level of the surface layer of the screed equal to that of the lower one;
- reduce the main factors responsible for shrinkage.

The first solution is not practical especially where screeds which need to dry (often quickly) before the application of the adhesive are concerned. In fact,

any residual humidity in the screed over a certain threshold would spread slowly through the superficial covering, affecting its stability (detachment of wood, bubbling of the rubber layer, etc.).
The second solution involves a careful evaluation of the parameters that influence shrinkage. There are two essential components in a cement mixture: the cement matrix and the aggregate ratio. Thanks to the cement hydration process, the aggregates become a monolithic composite material in which the individual elements become bonded by the particles which form when the cement is wet.
In any case, the two components of the composite material behave very differently when it comes to drying (i.e. when the residual water is transferred from the material to the very humid atmosphere [R.H. < 95%]).
While the microstructure of the stone that makes up the aggregate is very dense and compact, the cement matrix microstructure is porous (Fig. 4) and this porosity increases with the amount of water (w) used in relation to the quantity of cement (c), i.e. according to the water/cement ratio (w/c).
When the water transfers from the cementitious mix, the cement matrix contracts, but the variation in the size of the aggregate is either none or negligible.
There are two ways in which cement mix shrinkage can be reduced:
• reduce the ratio of cement paste, which gives rise to the shrinkage, to the aggregate which does not. This means that you will have to increase the amount of aggregates (a) and reduce the amount of cement (c), i.e. increase the a/c ratio;
• reduce the w/c ratio to decrease the porosity of the cement matrix and thus its tendency to loose water.
In Table 1, we have the shrinkage values recorded after one month of exposure in an environment with a R.H. of 50% for a selection of cement mixes.
For example, given an equal w/c ratio (0.40), mix A shows greater shrinkage than mix B as it has a smaller a/c ratio.
On the other hand, given an equal w/c ratio (7), mix D shows less shrinkage than mix E and F due to a smaller a/c ratio.
For example, at an equal w/c ratio (0.40), mix A shows more shrinkage than mix B as it has a smaller a/c ratio.
From a practical point of view, if you want to reduce the w/c ratio and increase the a/c ratio, you have to:
• aim for the lowest thickness possible to reduce the amount of mixing water;
• use additives which reduce water whilst still giving the same consistency;
• use graded stone aggregate of the largest possible diameter (8 mm if possible).
Table 2 shows the influence of the aforementioned parameters on the quantity of water and thus, given a set w/c ratio, on the quantity of cement paste responsible for the shrinkage. For example, in a very plastic mortar containing aggregate with

Fig. 4 Microstructure of a cement paste photographed using a scanning electron microscope.

maximum diameter of 4 mm, the quantity of mixing water (Table 2) is around 200 kg/m³; if the w/c ratio is 0.40 the amount of cement used will be: 200/0.40 = 500 kg/m³.
Thus, the total quantity of paste amounts to 200+500 = 700 kg/m³, while the quantity of aggregate (calculated by difference through a balance of volume) is 1,500 kg/m³.
This means that the shrinkage of this mortar at one month (remember the a/c ratio is 3 and the w/c ratio is 0.40) is around 400 µm/m (Table 1).
If a dry concrete is used with a maximum diameter of 8 mm, the mixing water (Table 2) falls to 160 kg/m³ and with the same w/c ratio of 0.40, the amount of cement decreases to: 160/0.40 = 400 kg/m³.
Therefore the amount of cement paste in the concrete decreases to 160+400 = 560 kg/m³, while the amount of aggregate increases to1,810 kg/m³. It follows that for this concrete, which has an a/c ratio of 4.5 and a w/c ratio of 0.40, shrinkage falls to 250 µm/m (Table 1).
And finally, if for the same concrete an additive capable of reducing the mixing water from 160 to 115 kg/m³ (with the same consistency when dry) is used, the amount of cement (at an equal w/c ratio of 0.40) would become 115/0.40 = 288 kg/m³.
Thus the quantity of cement paste is reduced still further to 115 + 288 = 403 kg/m³, while the quantity of aggregate rises to 2,025 kg/m³.
As a result, the shrinkage of this mixture (which has a a/c ratio of 7 and an w/c ratio of 0.40 and to which a superplasticising additive has been added) falls further to 100 µm/m.
The mixing water values contained in Table 2 and the consequent quantities of cement paste calculated above refer to carefully graded aggregate. If the aggregate does not contain a good mix of grades and tends towards a one-size aggregate, the voids between the stone elements increase and more cement will be required to fill them, resulting in more shrinkage.

Tab. 2 - influence of maximum diameter of aggregate and consistency on quantity of mixing water (approximate values).

Maximum diameter of aggregate	Water (K/m³) used at CONSISTENCY OF MIX dry	plastic	runny
4	180	200	220
8	160	180	200
16	140	160	180

N.B. The water mix values can be reduced to 30% by using superplasticising additives.

Tab. 1 -Shrinkage of cementitious mixes exposed for one month to air with a R.H. = 50% .

Mix no.	a/c	w/c	Shrinkage (µm/m)
A	3.0	0.40	400
B	4.5	0.40	250
C	6.0	0.40	150
D	7.0	0.40	100
E	7.0	0.50	200
F	7.0	0.60	300

CONCLUSIONS

To minimise shrinkage of flooring screeds and the consequent risk of curling and cracking, the following steps should be followed:
- keep the amount of mixing water as low as possible to give a drier laying consistency and also use water-reducing additives;
- aim for the largest possible maximum diameter of the aggregate used to minimise the amount of shrinkage-causing cement paste.

*Department of Materials and Earth Sciences, Faculty of Engineering, University of Ancona.

Turbog farming tanks

*by Francisco Conde Rodríguez and Manuel Ángel López**

In April 1999, Evotec S.L.was awarded the contract for the waterproofing, protection, and soundproofing of a tank used for turbot farming in Cambados (Pontevedra) in Spain.
It had been decided that asphaltic SBS linear panels would be used for the waterproofing of the outside wall and the covering. However, this solution meant that there was still much doubt about the waterproofing and protection of the inside of the tank, which was the first of

1. Exterior view of the tank with power supply and ventilation system

2. Close-up of tank cover

3. Close-up of main tank with MAPELASTIC covering (before final cleaning)

its kind in Europe.
Under the supervision of Unitec, the company responsible for drawing up the project plans, Evotec began work using a series of options which would provide utterly reliable and guaranteed solutions and that would also ensure the following:
• complete and constant waterproofing of the inside walls and substrate, thus making the tank watertight;
• no alteration whatsoever due to permanent contact with sea water;
• no alteration whatsoever due to contact with ozone, the purification agent used;
• resolution of the problems associated with fixing HDPE piping in the concrete walls;
• harmlessness to fish being raised in the tank;
• a non-aggressive surface.
Working on this basis, Evotec created a suitable solution which the Technical Management Team at Ibermapei, a Mapei subsidiary in Spain, approved in full. We will describe it in the following sections.

Principle characteristics of the tank

The tank consists of three cylindrical rings of pozzolanic H-250-12 concrete with internal radiuses of 24.95, 13.7 and 6.9 metres respectively. These rest on a H-250-12 concrete substrate which itself has a radius of 24.35 metres.
All of the walls are 30 cm thick. The structure consists of one tank which is used for turbot production, a second used for fry development, and one tank for water sedimentation and purification. It also includes three rooms containing machines, electrical power sets, and computer control stations for the whole plant.

Application of the waterproof and protective covering

The phases completed in the various areas of the plant were as follows:
- *Turbot production area*

The work done here consisted of:
• pressure cleaning the walls and substrate;
• plugging the insulating pipes with MAPEGROUT FAST-SET, a fast-setting, fibre-reinforced mortar.
• using MAPEGROUT FAST-SET to make 240 m of perimeter profile with a radius of 23.95 m and another with a radius of 13.7 m;
• application of a covering using MAPELASTIC, a two-component waterproof flexible cement mortar, to the 23.95 m and 13.7 m radius walls to a height of 5.7 m over the final level of the base.
2,562 square metres of covering were applied in all between the base and walls.

- *Fry development area*

The work done here was the same as that carried out in the turbot production section. This area is smaller with two radiuses of 12.35 m and 8.25 m and a height of 1.3 m, at a height of 6 m in the tank, requiring 130 m of profiles and 435 square metres of covering.

- *Sealing of insulating HDPE pipes*

Once the protective, waterproofing covering had been created, the concrete was divided into various sections at various heights in the tank to allow the passing and connection of the HDPE pipes which would carry various fluids. This obviously meant that the waterproofing had to be done again at these critical points. This work was carried out as follows:
• IDROSTOP, a hydrophilic expandable

rubber section, was used to make a profile along the circumference of the various pipes. It was held in place using IDROSTOP MASTIC, a single-component adhesive;
• next, a MAPEGROUT HI-FLOW, a fibre-reinforced fluid mortar was poured in;
• the final finishing touch came courtesy of LAMPOSILEX, a ultra-fast setting binder;
• MAPELASTIC was also applied at these points to ensure that the covering would not be broken.
44 HDPE pipes of different diameters were completed in this way.

A successful job

As the time available to do the job was very short (under a month!), we worked very, very hard during the construction of the various sections to allow the installation of the other elements of the tank. This meant that it was possible to carry out the load test using saltwater very quickly. Despite the unusual nature of the job and the difficulties involved, the work done proved a complete success, doing very well at the critical points which had been giving the designers cause for concern.

*Francisco Conde Rodríguez, Technical Industrial Engineer, Technical Director of Exotec
*Manuel Ángel López Technical-commercial Director Ibermapei

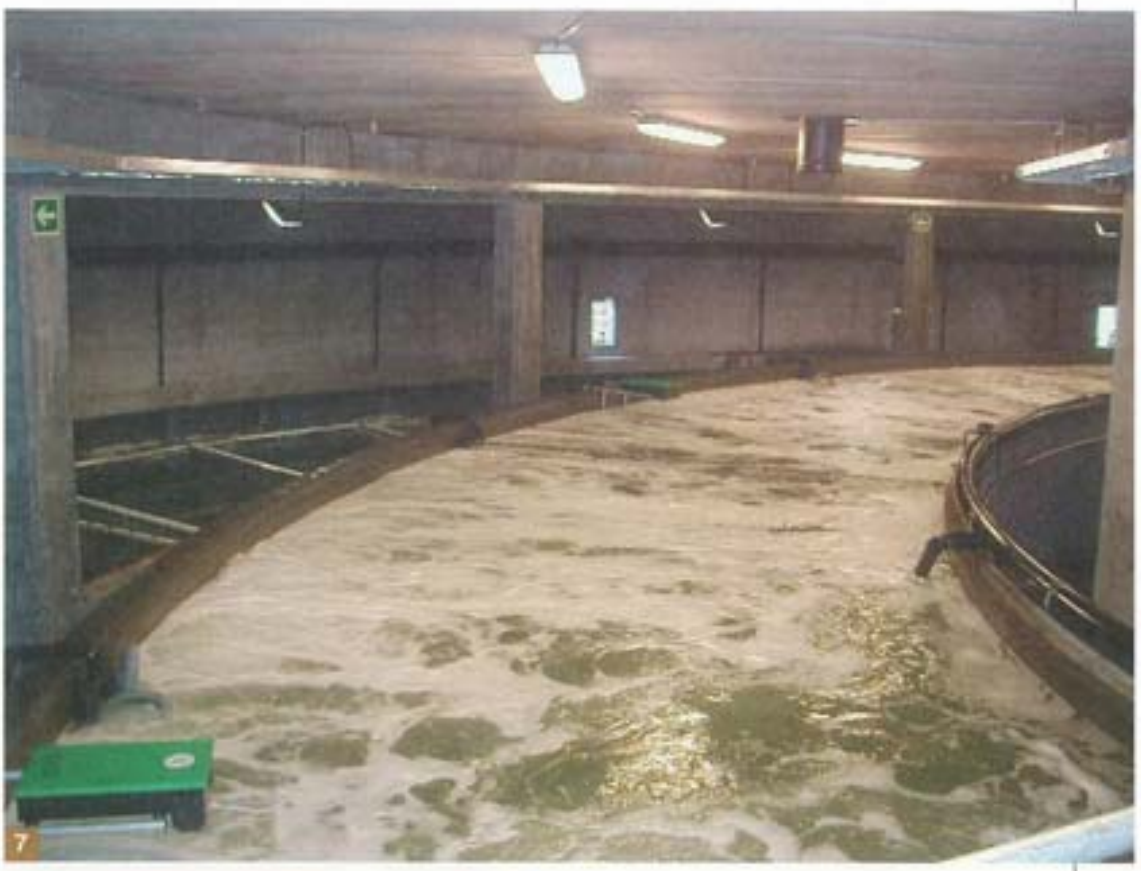
4. Fixing of the HDPE pipes into the wall of the main tank

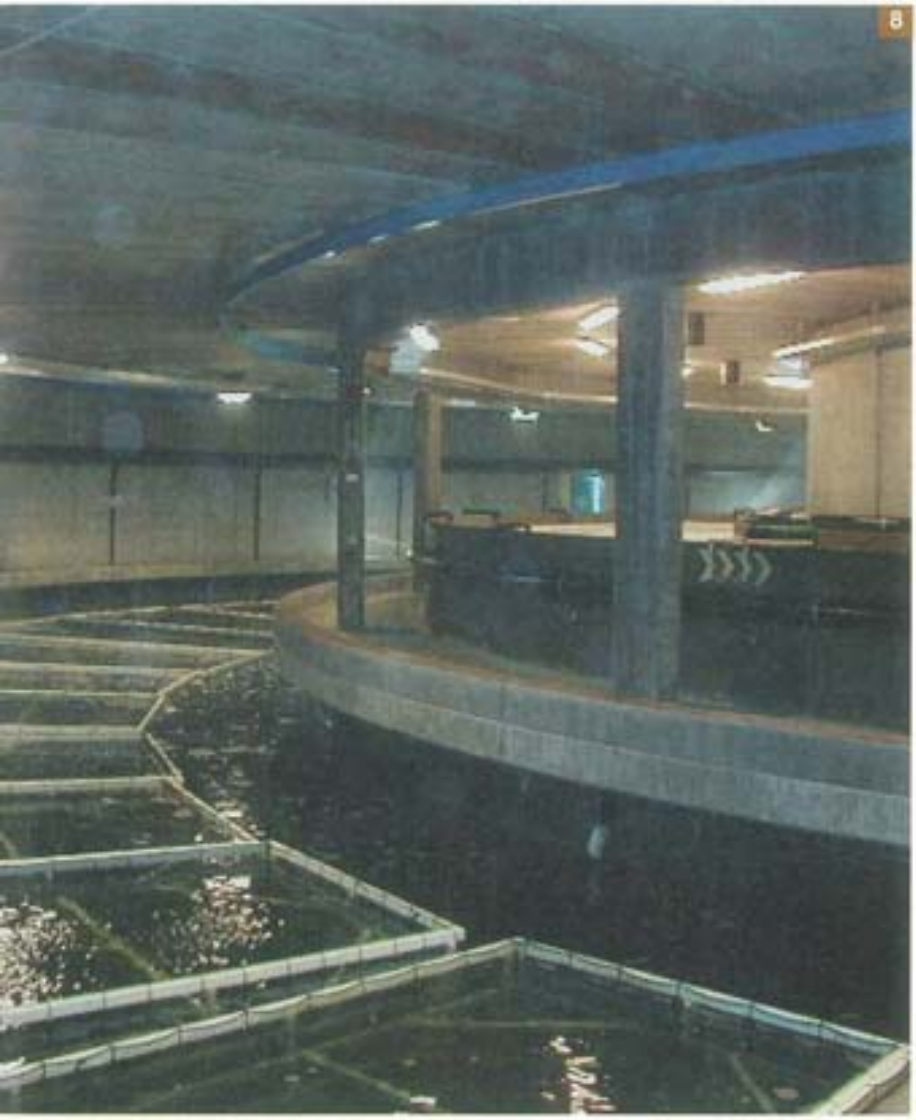
5. HDPE pipes in main tank after sealing

6. Fry tank covered with MAPELASTIC (before final cleaning)

7. Load test with addition of oxygen before opening

8. View of turbot cages and their automatic movement system





TECHNICAL DATA

Turbot farming and production tank - Cambados (Pontevedra) - Spain

Work done: 1999 (begun 14 June, finished 10 July)

Client: Aquacria Arousa, S.L.

Design: Unitec

Works Manager: D. Marcial de la Fuente, civil engineer.

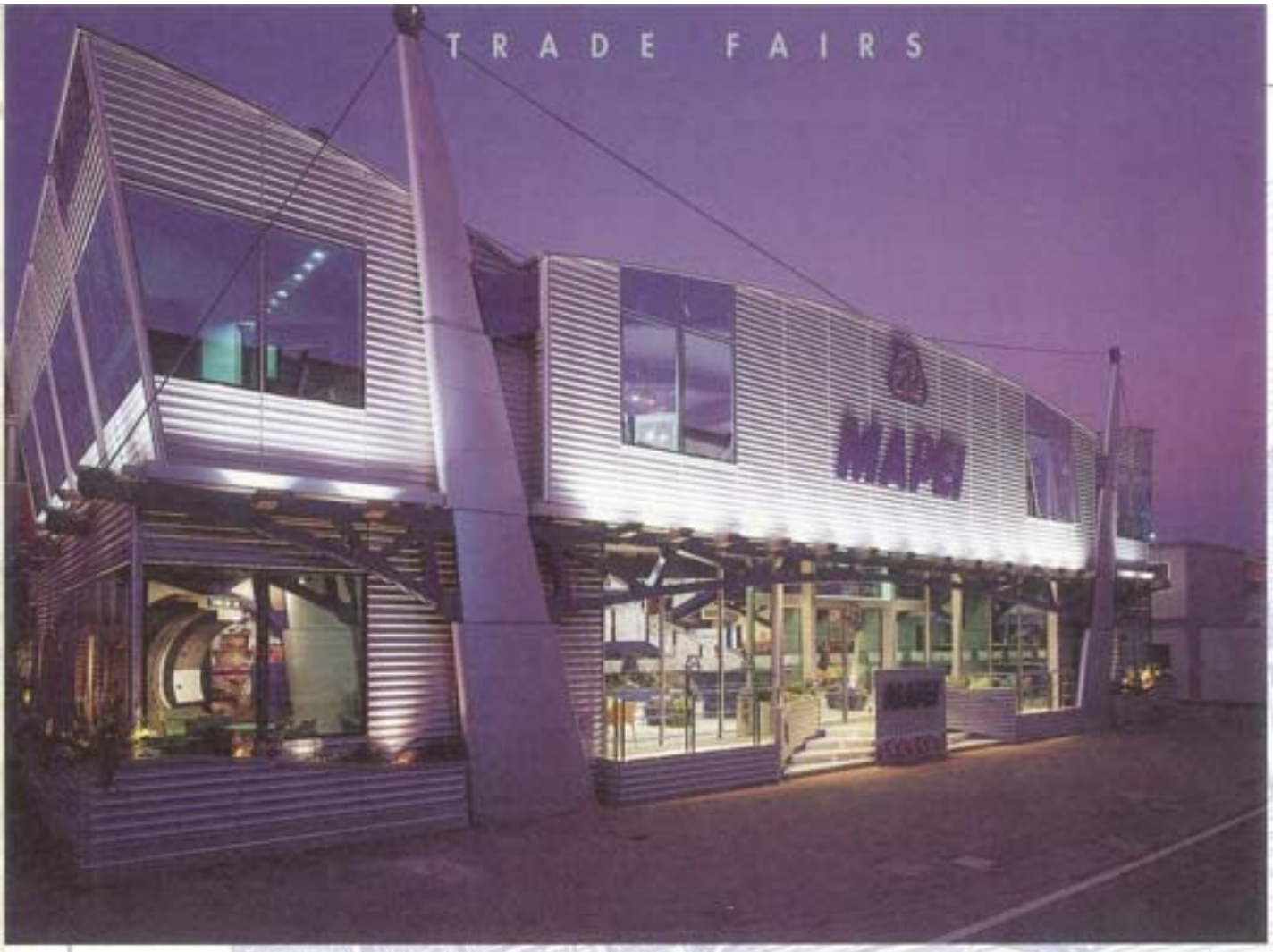
Builders: OHL

Waterproofing company: Evotec S.L.

Waterproofing and protection products:
MAPELASTIC
MAPEGROUT FAST-SET
IDROSTOP
IDROSTOP MASTIC
MAPEGROUT HI-FLOW
LAMPOSILEX

Mapei co-ordination: Manuel Ángel López

The Technical Data Sheets of the products mentioned in this article are contained in Mapei binder no. 3 Building Line.



MAPEI'S NEW HOME

Mapei asserted its presence at the Cersaie fair with a large, completely new structure – best described as a pavilion rather than a stand.

by Enea Nannini

A fair's life is brief and full of complexities. If a company is to communicate itself successfully in such a short time, it must weave a complicated web of relationships, put itself on show, express its corporate philosophy and do business – all within a limited yet crucial period. The stand is a vital weapon in the fight to attain these objectives - at the fair, the stand is the company. That's why its image is given a regular makeover. But Mapei wanted to go a step further: instead of contenting itself with a normal makeover, it has created a stand capable of doing full

justice to the creative spirit that suffuses the world of ceramics - and the result was more a pavilion than a conventional stand! In fact, Mapei presented itself at this year's Cersaie in a whole new set of clothes – as many readers have been able to see for themselves. The new stand was designed by the architect Enea Nannini's Archenea studio, acknowledged experts at creating exciting and intriguing settings for the Italian ceramics industry (in Orlando for Coverings '99 and at Europolis 2000 with Certown) and for the building industry in general. The Cersaie structure has three relatively large aisles (28 m x 15 m, and a maximum ceiling height of 8.63m) over two levels, with a large circular central double space. Inside this is the double staircase, rising symmetrically along the sides of the reception area, opposite the entrance. The ground floor is seductive and convivial – this is the space that contains the intriguing new developments and the lounge for in-depth technical studies and meetings. The upper floor welcomes more intense, rigorous and targeted gatherings. Made entirely of steel, the load-bearing frame consists of five pairs of slanting columns. Connected to these are the five main load-bearing walls, supported from the exterior by five pairs of pillars, all left in full view. The outer cladding is made up of modular panels, designed and manufactured especially for the stand, as are the floor and roof panels.

These sandwich panels have an extruded outer coating which, after coupling, forms an undulating surface, and an internal surface of aluminium leaves to which steel bolts are fixed. The panels are filled with thermo-acoustic insulation materials. Glass and aluminium were used for the glazing. The covering is made up of self-supporting panels resting on the beams of the main walls, while the flooring consists of mats supporting metal panels with a "mandorla" surface on the extrados and a smooth sheet of metal on the intrados. The dividing walls are hollow modular panels on the ground floor and aluminium and glass screens on the first. The majority of the furnishings were created specifically for the stand.

The design concept behind the new stand embodies the world of Mapei – an international company operating in today's world yet with a strong individual heritage. In this way Mapei seeks to communicate an increasingly high-tech image, one that reflects the technology behind its products, using a space better able to contain the increasingly wide range of products presented at Cersaie and Saie.

The aim is to reflect the Group's international character and provide a meeting point for clients and building

Details of the project and structure layout

industry operators. So it's a space charged with technical and creative ideas. And so a significant structure came into being, more a pavilion than a conventional stand. Just one question remains to be asked: how can it be used in the future?

Mapei: adaptable persistence

The fair is an exciting, chaotic and intriguing reality, a ritual of presence and mutual wooing, all within a strictly limited – yet vital - period. The fair is a time for visit, for display. It's the sometimes tiny gap that separates the winner from the rest of the field. In this competition, the stand is a vital weapon, armour and sinew for the warrior entering the arena – the company enters the field, accepts the applause and dominates. Above all, it must be coherent. The rules of the game apply to all: they are the dimensions, safety standards, and space allocated to each exhibitor. At the fair, the stand is the company. Every detail embodies production methods, the company's market presence. Everything speaks of the brand, every detail represents the whole. Mapei is a market leader in products and research, supports winners and offers in-depth solutions for the most modern and advanced constructions. The structure, built within an autonomous space – or at least not too close to other products – is therefore not only the Mapei stand. Within the period of the fair, it is Mapei.

The industrialist's ideal, factory designed for solidly rigorous production: externally, the stand is supported by five fully visible pairs of columns. They typify the structure, reflecting an industrial model, reinterpreted and straining eagerly towards the future. Pins, beams, fixing bolts, anchor cables - together they create almost a poem to high-quality manufacturing, a poem for today, a poem of welcome and hospitality, a work to encourage and reaffirm. An ethical building, conceding nothing to ephemeral whim, giving room for the knowing irony of quotation. Because in its play, it confers functionality.

The internal space is intentionally hierarchical, in the true sense of creating levels. And though the ground floor is convivial and welcoming, the world of Mapei comes fully to life on the upper floor, expressing the tension between man and action that has allowed the company to break through inconceivable barriers. Mapei is not a company that gives easy praise – its sponsorship choices have so far emphasised the quality of discipline that ruthlessly winnows out the winners, a quality deeply rooted in the collective Italian consciousness. Because Mapei, while operating in the world market, takes pride in its heritage. The stand reflects all this – it is both reference point and benchmark, embodying the world of Mapei.

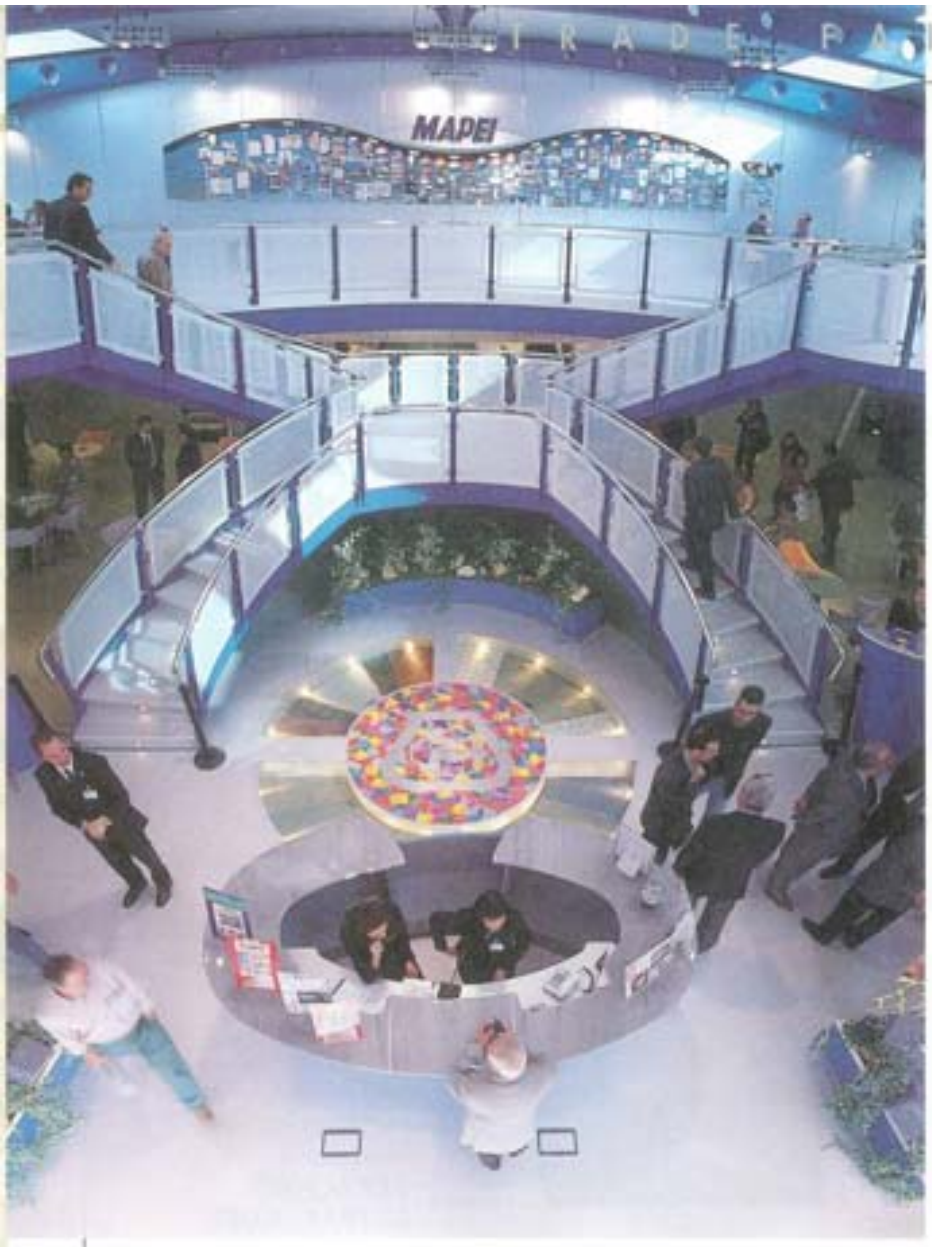
By Massimo Goldoni – Corporate Communications consultant

MAPEI'S STRATEGY FOR CERSAIE 2000

The choice of the new stand was dictated not only by the aesthetic considerations of Mapei's new image. There were also technical-organisational factors behind the decision. In particular, a larger space was needed, one capable of presenting the innovations developed in Mapei's R&D labs and big enough to welcome all the visitors and tile distributors from all over the world – people who every year, as if taking part in ritual, flock to Bologna expressly to see the latest product innovations. The Mapei Group has been implementing its globalisation strategy for some time now. It is a strategy intimately related to developments in the world of ceramics. Adriana Spazzoli, the multinational's head of operational marketing, explains, "In this way, we can offer a level of high added value service our competitors find difficult to match."
There's something else to bear in mind. For Mapei, Cersaie isn't a commercial fair – it's more a time for meetings and communication, targeted, of course, towards visitors, but also towards ceramics producers - as Mapei products complement finishing products and give "semi-finished" products such as tiles reliability and elegance. They allow, in short, the production of flooring and walls for all conditions of use. The quality of communications also does justice to Nannini's innovative and highly technical stand. New photos of the adhesives and grouting products are silhouetted on plexiglass panels, creating screens with an almost surreal quality. And innovations are illustrated, highlighting an important fact: the new products comply with the CEN and ISO requirements. The removable MAPETEX SYSTEM tile fixing process aroused particular interest. This is also of great value to tile distributors in the form of an innovative display system, allowing new ceramics products to be presented without excessive and costly work.

To the rear of the stand, the various new tile laying systems currently in widespread use for building projects are presented with display sections, notably:
- Rapid (ADESILEX P4 – ULTRACOLOR) and normal self-wetting systems (PLANOBOND – ULTRACOLOR – MAPESIL AC)
- Rapid system (MAPECEM – GRANIRAPID – ULTRACOLOR)
- Waterproofing systems for interiors (PRIMER – MAPEGUM WP – ULTRAMASTIC III – ULTRACOLOR) and exteriors (TOPCEM PRONTO – MAPELASTIC - GRANIRAPID – KERACOLOR+FUGOLASTIC)
- Flexible system (KERABOND+ISOLASTIC – KERACOLOR+FUGOLASTIC and TOPCEM – KERAFLEX – ULTRACOLOR0 MAPEFONIC
And solutions for more unusual applications:
- Heated floors (ULTRAPLAN – KERAFLEX – ULTRACOLOR)
- Overlaying (old ceramics – KERAQUICK – ULTRACOLOR)
- Installing rustic (ADESILEX P9 – ULTRACOLOR)
- Installing cotto (MAPECEM – GRANIRAPID – ULTRACOLOR – KERASEAL).

But let's return to the stand. A flight of stairs leads to the upper floor: this is an area emphasising relations based on rigour, care, objectives and results. An intriguing panel stands at the back, relating the history of Mapei from 1937 to 2000. Cersaie was also the right moment for a reassessment of the company's 63 years of activity, a time during which it has transformed itself from a small craft industry founded in Milan, to produce wall-finishing products, into a leading global group producing adhesives, sealants and chemicals for the building industry. And many people recognised aspects of their own story in the panel's series of illustrations, with descriptions of moments when the company broke into new markets, launched new products and carried out work at highly



Abdullah Aba Hussain Trading Est of Riyadh, Saudi Arabia) and the Cersaie journalism prize awarded to both the American, Santiago Montero, of Floor Covering Weekly and the Korean, KiJong Moon, of Space monthly, for their informative articles about the conference. The awards were presented during the international press conference in front of 150 journalists, with Gioacchino Gabbuti, general director of ICE, and Giorgio Squinzi, Chairman of Federchimica. Worth noting is Mr Squinzi's declaration concerning Cersaie: "The exhibition has no equal anywhere in the world."

Left: Giorgio Squinzi managing director Gioacchino Gabbuti, general director of ICE, Angelo Borelli, president of Assopiastrelle and Franco Vantaggi, general director of Assopiastrelle

prestigious sites. The vital role played by research stands out – developing many essential tile laying products, even for conditions so difficult that they were previously considered impossible. And it is this commitment that underpins the group's desire to implement world wide the design and development of a product system of guaranteed quality. At Cersaie, too, Mapei sought to express this global philosophy, a policy it has followed unwaveringly since the sixties, sponsoring a series of events that have excited great interest: the Assopiastrelle prize awarded to four foreign distributors for raising the international profile of Italian ceramics through their commercial activities (GME at Aubervilliers, France, J+H Fahling Gmbh at Lohne, Germany, the Polish company Dom Handlowy Valdi of Warsaw and Najm

How can the end of the century be high lighted? Through ones history. This pannel relates the events, new manufacturing plants and products from 1937 to 2000

SEEN AT CERSAIE 2000

Coloured grouts

Six safe, practical Mapei products conforming to European requirements (prEN 13888), for use in grouting all ceramic and stone floor and wall and coverings, in a range of 26 fashionable colours.

New look for Packs

Mapei has new look. Cersaie was the testing ground for new packaging - a new look for the new millennium, and above all for the developments that have characterised the company's operations over the past few years.
A fresher image, a strong message that means immediate product identification.

New products

_ MAPETEX SYSTEM: a removable system for ceramic tiles
_ ADESILEX P10: a special adhesive for mosaics.
_ KERAFLEX MAXI: a high adhesion tile adhesive with almost zero vertical slippage.

These new developments enhance the already wide range of tiling products. All Mapei ceramic and stone adhesives conform to prEN 12004 requirements.

Technical assistance

Mapei offers skilled technical assistance, also available at fairs.

Spectacularly impressive references

Mapei's spectacularly impressive references bear witness to the concrete, tangible results achieved by Mapei products around the world.

Mapei Systems

Not just individual products, but complete systems to guarantee the best results. Mapei presented some especially interesting examples at Cersaie - interior and exterior waterproofing systems, rapid installation systems, acoustic insulation systems, systems for installing heated flooring and removable systems for overlaying tiles.

NEW PRODUCTS

Mapei used their innovative stand to launch some new products, already available in new packaging, at Cersaie. These products are designed to enhance the already wide range of solutions for installing ceramics and natural stones. They are MAPETEX SYSTEM, ADESILEX P10 and KERAFLEX MAXI.

MAPETEX SYSTEM

A fully removable ceramic and natural stone tile installation system. It can also be used as a crack suppressant and anti-fracture layer. It is particularly recommended for display spaces, as it allows for a rapid replacement of the covering without damage to the pre-existing structure.

ADESILEX P10

A white cementitious adhesive with high adhesion and almost zero vertical slippage, for vitrified, ceramic or marble mosaics. It can be used with vitrified or ceramic mosaics on paper or mesh on walls and floors, interiors, exteriors and swimming pool surfaces.

KERAFLEX MAXI

Cementitious adhesive for thicknesses of 3 to 15mm, with high resistance, good deformability and almost zero vertical slippage, for ceramic and stone tiles. Recommended for exterior and interior ceramic or natural stone floor and wall covering (which must, however, be stable in humidity) on traditional substrates.

KERAFLEX MAXI can also be used for fixing small and large formats on disconnected substrates without levelling, with zero slippage even for heavy tiles. This product has also been designed for overlaying on existing flooring and cladding, and also for insulation materials such as expanded polystyrene, expanded polyurethane, glass or mineral wool, Eraclit or sound absorbent panels.

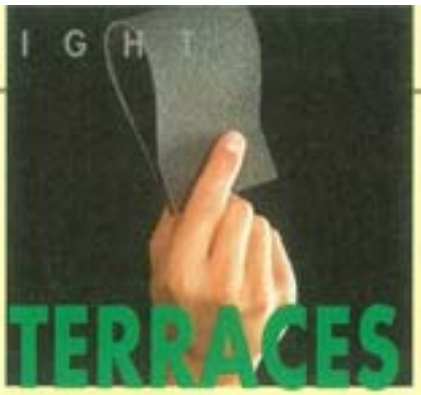
COLOURED GROUTS 2000

All products from the "COLOURED GROUTS 2000" line were also on display, with new packaging, new documentation and in 26 new colours.

These were KERACOLOR FF, KERACOLOR GG, ULTRACOLOR, KERAPOXY and MARMOCOLOR, products already in widespread use and now presented in the new, recently improved formula.

All Mapei grouting products conform to prEN 13888 requirements.

MAPELASTIC FOR BALCONIES AND TERRACES



A flexible waterproofing system for balconies and terraces

Balconies and terraces must be waterproofed to avoid the risk of water infiltration damaging flooring materials over time. Waterproofing will also cut down on maintenance costs. Mapei has developed a balcony and terrace waterproofing system that will guarantee total waterproofing even in extreme conditions combined with top class flexibility, essential for areas subject to vibration and/or structural movement.
This system consists of a range of products which represent the best technology the sector has to offer. It is already in use with tiles for exteriors with low water absorption. Installation is possible on the old ceramic, clinker or paving tiles, etc. or on a cementitious screed.

The system includes:

● **MAPEBAND**
A synthetic rubber tape for sealing all kinds of corners and expansion joints.

● **MAPELASTIC**
A flexible two-component cementitious mortar. The ceramic covering can be applied when the product is completely dry (after approximately 2-3 days).

● **FIBREGLASS MESH**
A synthetic mesh used to reinforce MAPELASTIC. This mesh should be used as a rule as it facilitates the application of an even thickness of the product and improves the resistance of the material where the base surface is unstable or cracks over time.

● **GRANIRAPID**
Fast-setting, two-component cementitious adhesive with rapid hydration.

MAPELASTIC, the perfect solution to a whole range of dampness and infiltration problems. **MAPELASTIC** is a waterproof protective mortar and is suitable for use in the following cases:

- waterproofing concrete water tanks of various kinds
- flexible waterproof smoother for renders with hairline cracks
- protective, waterproof covering for exterior walls below ground level
- waterproofing of bathrooms, showers and other damp environments, swimming pools, etc. before the installation of ceramic coverings
- flexible smoother of concrete slabs which are thus prone to deformation caused by weight (e.g. prefabricated buildings)
- waterproof, protective covering for concrete surfaces subject to damage from chemicals, such as thawing salts, sulphates, etc.

Developed in the Mapei research laboratories, **MAPELASTIC** is a two-component mortar based on cements, graded fine-grain aggregates, special additives and synthetic polymers in water dispersion.

● **KERAPOXY**
Two-component acid-resistant epoxy grout for sealing joints resistant to atmospheric agents.

● **KERACOLOR+FUGOLASTIC**
Depending on the situation, the joints can be made using KERACOLOR+FUGOLASTIC, a ready-mixed cementitious mortar and a liquid polymer admixture.

● **MAPEFOAM**
Expanded polyethylene foam cord used to regulate the width of the sealant.

● **MAPESIL AC**
A single-component acetic-based silicone sealant for expansion joints where the width of the joint is subject to a maximum 20% expansion.

The system presented here is the optimum choice and also very safe. Nonetheless, some of the above products may have to be replaced or left out completely depending on the particular job involved and the problems it presents.

A multi-use product

Of all the products which make up our balcony and terrace waterproofing system, we would particularly like to highlight

A runny mixture is obtained by mixing the two components. **MAPELASTIC** is easy to apply even to vertical surfaces up to thickness of 2 mm in a single coat. Thanks to its high synthetic resin content, **MAPELASTIC** offers excellent adhesion on all concrete and brickwork surfaces.
When it hardens, it creates a flexible layer which is impermeable to CO_2, SO_2, chlorides, and sulphates.

BALCONY facing reconstruction

The range of concrete repair products specially formulated by the Mapei Research and Development Laboratory was the star of the renovation and conservation work carried out recently on the balconies and balcony facings of a 1960s building in Piedmont.

Built in the 1960s, the Campello condominium takes up a whole block of the Borgo Enel area of the town of Chivasso in the province of Turin.
The building had suffered much from the ravages of acid rain with severe deterioration of the exterior with consequent carbonation of the concrete.
The façade overlooking the public street is made of a mixture of materials, brick, stone and plaster, while the internal façade overlooking the courtyard was finished using ordinary plaster. Most of the damage had been done to the balcony facings on both façades. The work required on the Campello condominium involved the renovation of 1,200 linear metres of balcony facings, which were in a very advanced state of disrepair and, in some cases, were bordering on dangerous.

Beautiful - inside and outside

The renovation of the façades was more than just an aesthetic operation as it also affected the structure of the building.
The lack of adequate protection for the façade covering can give rise to poor surface conditions which, in turn, can actually affect the equilibrium of part or all of the building itself.
In this particular case, some portions of plaster had come away exposing the reinforcing rods and had actually fallen on to the street (fortunately without causing any harm to anyone or anything) while other parts were in a fairly precarious state. Only a small part of the surface did not have any problems of this kind. The main purpose of the renovation work was to reconstruct the balcony facings. It began with the removal of all of the existing plaster so that the underlying concrete structure was exposed. Next, any residual substrate was removed from the visible reinforcement rods. Because of the difficulty of the work, the plaster was removed using hammers and chisels and then the surface was cleaned again using brushes and putty knives. Once cleaned of deposits, the exposed areas were treated with MAPEFER, a two-component corrosion-inhibiting cement mortar (photo1). MAPEFER's anticorrosive action is based on the fact that it is impermeable to water and aggressive gases present in the atmosphere (carbon dioxide, sulphur dioxide, nitric oxides), contains inhibitors which protect metal surfaces from oxidation, is very alkaline, and adheres perfectly to metal.
In short, thanks to MAPEFER, all of the reinforcing rods would now have long term protection.
After the MAPEFER, came a first coat of MAPEGROUT THIXOTROPIC, a shrinkage-compensated fibre-reinforced thixotropic mortar for concrete repair.
This created a rough coat. A second coat of the same product was then applied and finished off with a float.
The surface was then treated with

MAPEFINISH, a two-component cementitious mortar for finishing concrete surfaces, which waterproofed the concrete. The MAPEFINISH was smoothed using a special damp sponge. Next, the facings were painted with ELASTOCOLOR, a protective and decorative water dispersion acrylic resin-based elastic paint. White was chosen as it was similar to the one used when the condominium was first built.

Large scale progress..... for a job well done

When the work on the balconies was finished, treatment of the façades of the courtyard stairwells began. This involved renovating the damaged areas and painting the façade, which was in a much better condition than the balcony facings.
The walls were first hand-cleaned using brushes and putty knives. After this, any damaged parts were removed given that there was widespread and dangerous deterioration. The treatment of these surfaces followed the same pattern as the balconies, except that MAPEFER was not used because there were no reinforcing rods.
Having carefully cleaned the surfaces, a good layer of MAPEGROUT THIXOTROPIC was applied, followed by MAPEFINISH which not only covered the MAPEGROUT but also any small imperfections present in the plasterwork.


PHOTO 1

At the end of all of this, ELASTOCOLOR was applied to brighten up the façade and, most importantly, create a highly effective protective barrier against the destructive action of atmospheric agents (photo 2).
"In short, we can safely say that the products used in the renovation of the balcony facings and stairwell façades were very satisfactory and lived up to our expectations very well," said architect Giuseppe Laurella, the designer and director of the project.
"This is because we used products created specially by a firm which is at the cutting edge of the sector and compliant with all of the current regulations in force."


PHOTO 2

The Technical Data Sheets for the products mentioned in this article are contained in Mapei binder no. 3, Building Line.

TECHNICAL DATA

Campello condominium, Chivasso (Turin)

Built: 1960-1962

Renovated: end of 1997 to mid-1998

Project designer and director: Giuseppe Laurella, Chivasso (Turin)

Company used: Impresa edile Pasqualino Diurno, Montanaro (Turin)

Mapei products used in renovation work:
MAPEFER
MAPEGROUT THIXOTROPIC
MAPEFINISH
ELASTOCOLOR

Mapei co-ordinator: Valerio Mandelli

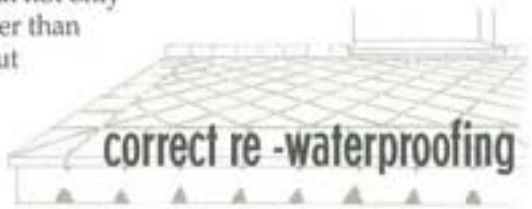
WATERPROOFING BALCONIES
A TYPICAL CASE

by Adelmo Bovio

This is a real case from the Mapei Technical Support files and involves a balcony waterproofing job that proved unsatisfactory. We take closer look at the problem to demonstrate the correct procedure to be followed for this kind of job if unpleasant surprises are to be avoided.

Four balconies, with a total surface area of 60 square metres, required renovation in a small building. The concrete on all four was showing similar signs of deterioration. The work included consolidation of the concrete followed by waterproofing to prevent water infiltration and attacks by frost, two of the main causes of the concrete deterioration. While Mapei concrete repair products were immediately chosen for the first phase of the job (the article which follows this one describes this kind of work in detail), a bituminous cover on which a 4 cm screed was installed was selected to waterproof the balconies. However, when the covering was being installed, it was noticed that not only was the exterior floor higher than that of the indoor rooms but also that the screed had warped and raised.

On the advice of the retailer, it was decided to replace the bituminous covering with MAPELASTIC, a flexible two-component waterproof cementitious mortar that would also have the advantage of providing a fast solution to the problem, as the porcelain tiles could be installed directly over it, thus making the outdoor flooring lower. Despite the fact that the correct products were chosen and correctly installed by an expert, the customer was not satisfied with the final result as the leading edge of the balcony became wet the first time it rained and it seemed that the waterproofing had not worked. As can well be imagined, this resulted in a complaint being made about the job and payment for both labour and materials was withheld.



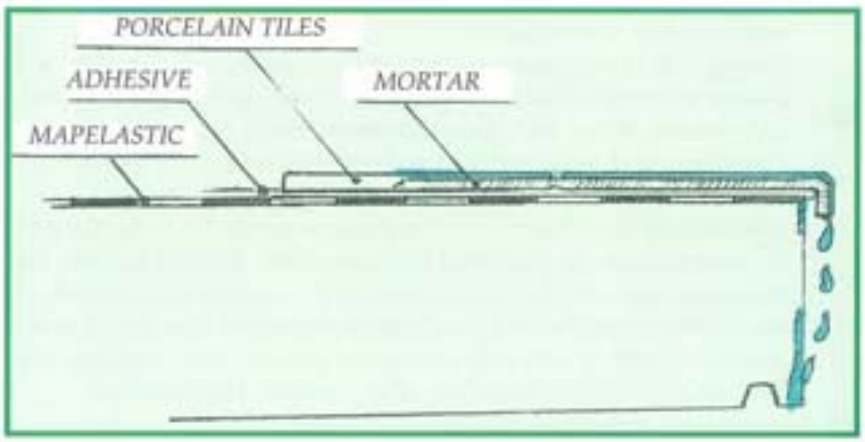
In order to find the cause of the problem, an inspection was carried out by a Mapei technician who confirmed that the flooring, done in 20x20 diagonally installed porcelain tiles with 8 mm joints, had been very well finished. The outer edges were also finished with a line of L-shaped tiles, the edges of which protruded a few centimetres, helping to drain water away.

Unfortunately, however, this extension was not enough to protect the whole height of the balcony facing, about 15 cm of which remained exposed. In fact, when some water was poured on the flooring, it was noticed that the balcony facing, which had been finished with a lime plaster, showed signs of localised water stains around the tile joints. There were some very small ones where the MAPELASTIC covering ended and the water that had soaked into the joint had spread to the plaster. The most obvious and extensive stains were located in the lower part of the facing and were clearly due to the dripping of water channelled outwards by the joints (see drawing).

Having thus established that the problem was not due in any way to products used but had been caused by the fact that the drip was not large enough, the situation was viewed from a different angle. There were two possible solutions. The first was to extend the MAPELASTIC waterproof covering on the balcony with a very small smoothening on the facing. This, however, would have been difficult to do. Alternatively, the scratch coat rendering on the front section of the balcony could be treated with ANTIPLUVOL S, a water-repellent siloxane resin-

the perfect method for the Mapei waterproofing system

based compound, which could be painted or sprayed on for easier application.
Tilers can learn some important lessons from this case. MAPELASTIC is a very safe product which is not particularly difficult to prepare or use, as is clear from the basic rules included on the technical instruction leaflet enclosed with the product. However, it is obvious that it must be properly used if it is to form a continuous covering on surfaces of any shape and size that require protection.
It must therefore be applied by hand in a uniform and continuous layer of 1.5-2 mm over all of the surface, including profiles, mouldings, corners and edgings with vertical walls. Drain pipes, flashings, and drips (even when metallic) should also be included as it will adhere perfectly to these too. MAPELASTIC's elastic qualities even at low temperatures mean that it can cope with elongations of up to 1 mm without cracking where there are lesions in the substrate. This capacity is improved significantly by inserting a fibreglass mesh of the kind recommended for very large surfaces and for edgings between walls and floors where most expansion and shrinkage take place. A second layer of the same thickness is applied over the first and this guarantees water-tightness. The finish might not have been water-tight due to some porosity in the first coat and so the second layer should be applied applied perpendicular to the first one.
Finally, another common myth is that if the joints of a tile floor are filled with putty, they do not need a waterproof covering, and that this is especially the case where KERACOLOR mixed with FUGOLASTIC is used. Nothing could be further from the truth. Unfortunately, we get requests of this kind from installers every week at Mapei Technical Assistance, especially when the rainy weather sets in and the first damp stains appear on the ceiling near a terrace or bow window. Even many foreign tile installers have a similar conviction even though several foreign-language installation instructions have clearly stated that a tile covering will not provide adequate waterproofing and where required, a special waterproofing layer must be installed first. The very obvious reason for this is that the principal function of the joints between the tiles is to absorb the differential movements caused by sudden changes in both temperature and humidity levels affecting the flooring. The simple and everyday changes in temperature that tiles are subjected to (think of the warmth of the suns rays in the morning and the cooling of the night) and even the shock of a sudden shower of rain or hail translate into compression and stress within the grout which, for this reason, has to have enough "give" in it to take such changes.
The mortars, which are normally cementitious, will thus have to have greater width and a very low elastic modulus. Even then the tiny lesions which will form after they are made must be taken into account. Lower mechanical resistance translates into significant porosity.
FUGOLASTIC was developed to deal with this problem as its job is to reduce the size of the pores thanks to a highly elastic polymer, without interfering too much with the increase of the elastic modulus of the mortar. Thus FUGOLASTIC cannot make any outdoor floor watertight although it can significantly reduce the penetration of water into the joints by keeping them breathable and making them easier to clean. I would like to finish up by reiterating that the Mapei Technical Assistance team is always here to clarify any doubts or questions that might arise when our readers are looking for the best solution to their problems. In the interests of all concerned, however, it is better to seek clarification before carrying out any work and to supply as much detail as possible about the conditions and requirements of the job when doing so.
In other words, the more specific you are about your problems, the more precise and thorough we will be able to be with our solutions.



A true STORY

1

This is the story of Joe Panzera, a long-time Mapei customer in Canada of Italian origin whose hard work, tenacity, and intuition have earned him considerable success.
A big thanks to Joe for his collaboration on this article.
We will also be introducing more Mapei customers who have become success stories in their own sectors in the near future.

by Rino Civardi

It is a beautiful summer's day, a loudspeaker blares, and hundreds of passengers begin to board a large ocean liner in a more or less orderly fashion. There are last hugs from the relatives and friends staying behind and tears, lots of tears, because for many this really is goodbye.


2

It is July 11, 1956 and the cruising ship Queen Elisabeth is preparing to cast off from the port of Naples for Halifax in Canada. One of the passengers is Giuseppe Panzera, a 16-year-old boy from the village of Ielsi in the province of Campobasso, who is leaving Italy to start a new life. His travelling companions are two other boys of his own age who are also embarking on a new future.
During that 12-day ocean voyage all those years ago, Giuseppe's thoughts turned to the future, a future that might yet prove to be just a dream. When the Queen Elisabeth finally reached the Canadian coast, he joined his two brothers and a sister who were already living in Canada. Giuseppe was very ambitious and immediately found work as an apprentice smith. He was paid just 45 cents an hour. At just about that same time, the first ceramic tiles also began arriving in Canada from Italy. Giuseppe immediately saw that they were sure to be a huge success and soon began work as a tiler's mate. It took him a couple of years to learn his trade and then, finally, in 1960, Giuseppe, who was now known as Joe, opened his own tiling business.

He bought himself a truck, equipped it, and began a new phase of his working life. There was a lot of work around and success came quickly.
In 1967, Joe made his smartest move yet and married Margherita. Later, in 1968, he joined his father-in-law's firm, which was already well-established in the building world, and from there began importing Italian ceramic products directly.
Joe also quickly added natural stone to the product range at Ciot which, thanks to his efforts, was now enjoying something of a boom.
His dreams of success quickly turned into reality and there were soon 20, then 40 and then 60 tile layers working in Montreal and in the State of Quebec. Ciot had conquered the market and become a leading company.
Joe and Margherita's daughter Cristina was born in 1970, followed by Claudia in 1972, and Joe's success in the business world was matched by his happy family life. At the beginning of the 1980s, the company opened a new 600 square metre showroom in Montreal. Others followed around the city and in Quebec town. Moving on with his expansion plans, in 1987 Joe decided to open a major showroom and warehouse (total surface area: 4,500 square metres) in Toronto. In 1997, he expanded with further two new sales outlets especially for designers and architects which soon became places to meet others in the business. Ciot now boasts eight sales outlets, seven showrooms, and eight warehouses. It also employs around 200 people, including Joe's wife Margherita, his daughters Cristina and Claudia, his brother Gennaro, and his nephew Michele.
In addition to his work, Joe also has three big hobbies at which he excels: cooking, shooting, and golf (he has a handicap of 20).
We would like to say well done to Joe and congratulate him on all that he has achieved. Italy owes you a big thank you, Joe.

1. *The Ciot headquarters and showroom in Montreal*
2. *Joe Panzera several years ago*
3. *Joe Panzera between his daughters Claudia who co-ordinates the showroom and Cristina, purchase assistant for the ceramic range and his nephew Michael, treasurer and general manager*
4. *The Toronto contractors service desk and some collaborators from Montreal and Toronto*
5. *From left to right: Joe Panzera, his brother Gennaro, responsible for the purchasing of ceramic tiles, his wife Margaret, vice president and administrator at a recent Cersaie show*

MAPEI SPORTS DIVISION

MAPEI QUICK·STEP

41 ATHLETES, 12 NATIONS

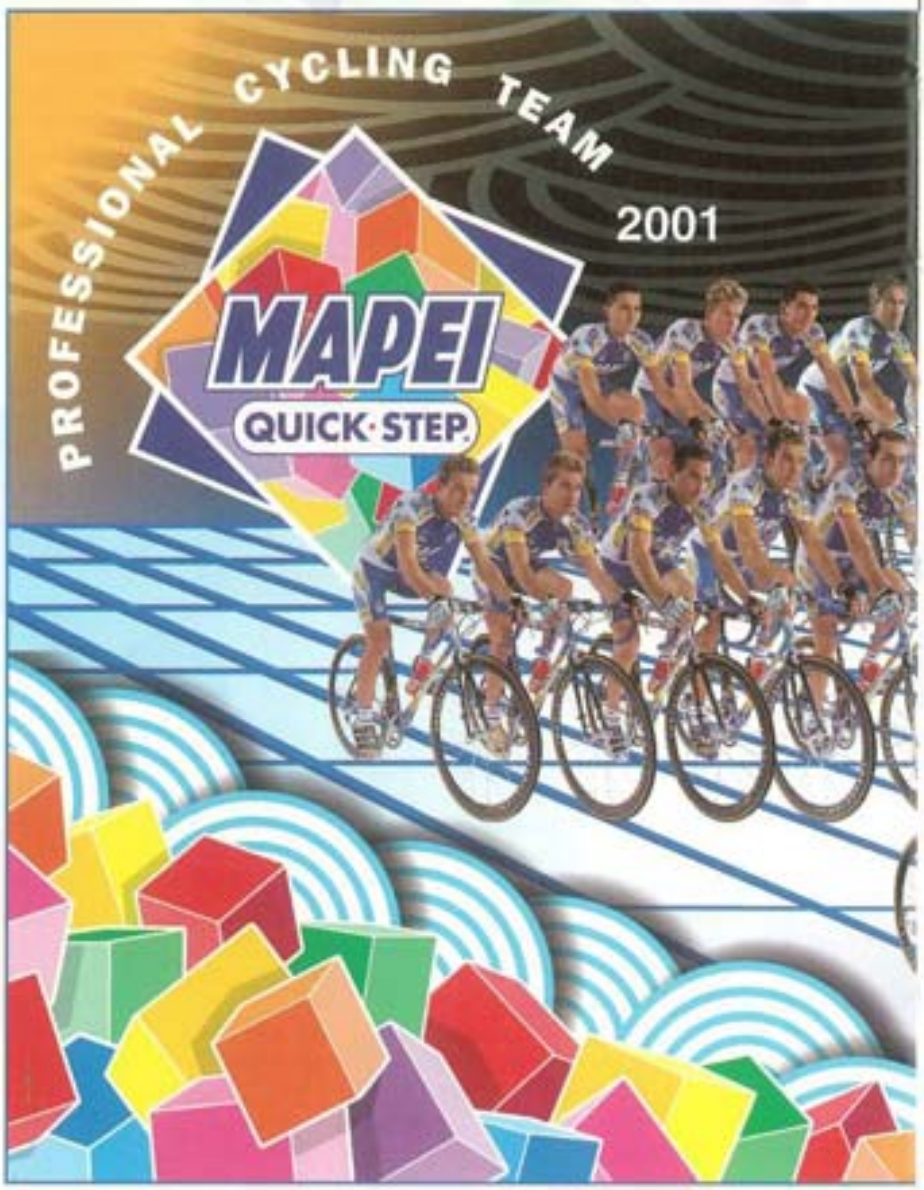
by Alessandro Brambilla

About 1000 guests of which the authorities, VIPs, subsidiary reps and clients were present at the presentation of the Mapei-Quick Step 2001 multinational professional cycling team. The "vernissage" took place on the 27th of January at Robbiano di Mediglia (Milan), the Mapei Groups' principal production plant. The runners also participated at the show presented by Susanna Messaggio and Antonio Ferretti.

The public really enjoyed the show of dancers, coordinated by Loredana Zucchi, and Enrico Ruggeri's live concert, a special "rider". The Mapei-Quick Step riders transformed themselves into singers during the last part of the show. They struck up "You can do better", Enrico Ruggeri's song that won the 1987 Sanremo Festival. This is their bet for the next professional season.

The Mapei Group is entering its eighth season as the principal sponsor of a professional team that is determined to reaffirm its peak position in world-class cycling. The numbers alone prove that Mapei has a long and glorious pro cycling record: the team has won 513 competitions since its formation on January 1, 1994. The team in the building-block patterned jerseys, otherwise known as Mapei-Quick Step in 2001, has dominated the UCI rankings ever since. Twice in 1994 the team set the Athlete's hour record with Toni Rominger, who was also the winner of the Vuelta a Espana in 1994 and the Giro d'Italia in 1995.

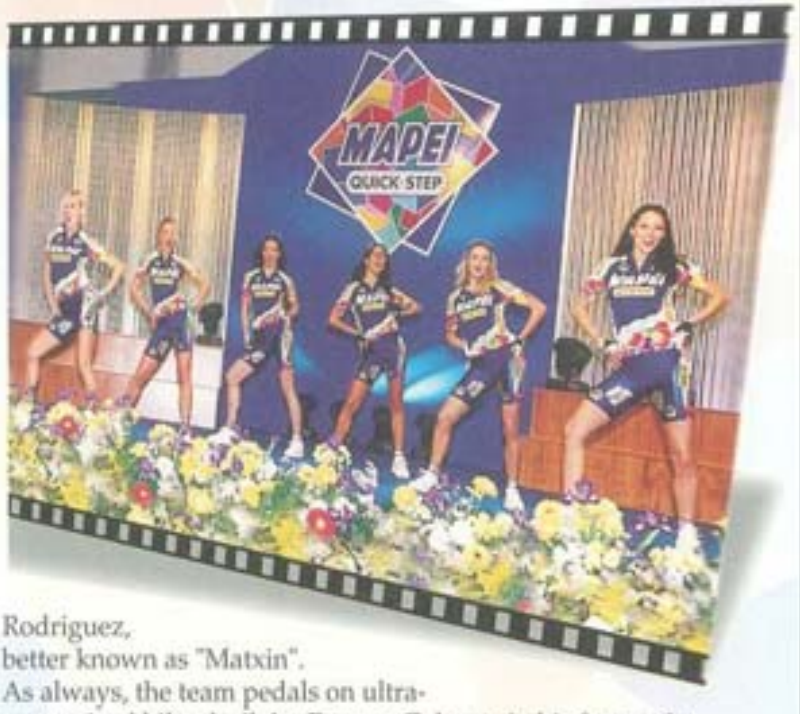
Mapei won the World Cup for road racing three times, thanks to Gianluca Bortolami ('94) and Belgian rider Johan Museeuw ('95 and '96). Giorgio Squinzi's "Groupe Sportif" was triumphant in four World Cup team competitions: '95, '96, '98 and 2000.



The Mapei warriors have racked up a total of 15 victories in World Cup Grand Prix, including 5 Paris - Roubaix races, the cobble-stone Classic race nicknamed "The Road to Hell" in which Mapei made cycling history with a triple-crowned victory, not once but three times. Mapei's Palmares also includes 3 World Pursuit Championships, with Abraham Olano winning the rainbow jersey in 1995, Johan Museeuw in '96 and Oscar Camenzind in '98. Mapei-Quick Step is starting the 2001 season with renewed enthusiasm and a team roster of 41 riders. The number of nations represented has risen to 12.
Italy is the homeland of the largest number of riders on the squad. The 24 Italian athletes are: Elio Aggiano (born in '72), Adriano Baffi ('62), Franco Ballerini ('64), Michele Bartoli ('70), Paolo Bettini ('70), Davide Bramati ('68), Gianpaolo Cheula ('79), Dario Cioni ('74), Crescenzo D'Amore ('79), Paolo Fornaciari ('71), Stefano Garzelli ('73), Graziano Gasparre ('78), Paolo Lanfranchi ('68), Daniele Nardello ('72), Rinaldo Nocentini ('77), Andrea Noè ('69), Luca Paolini ('77), Filippo Pozzato ('81), Eddy Ratti ('77), Antoni Rizzi ('78), Luca Scinto ('68), Andrea Tafi ('66), David Tani ('69), and Stefano Zanini ('69).
There are more Spanish riders this year than last season, four to be exact: Manuel Beltran ('71), Pedro Horrillo ('74), David Canada ('75) and Oscar Freire ('76). There are 3 Belgian athletes, Kevin Hulsmans ('78), Bart Leysen ('66) and Tom Steels ('71).

Left, the Robbiano di Mediglia plant, the Mapei Group's principal production plant, hosted the "vernissage".
Above, Antonio Ferretti and Susanna Messaggio

Left, moments of the show at Mediglia. Below, the dancer's different "looks".



Hailing from Australia are Scott Mc Grory ('69) and Michael Rogers ('79). Eight more riders come from as many nations: Laszlo Bodrogi (born in '76; Hungary), Bernhard Eisel ('81; Austria), Fabian Cancellara ('81; Switzerland), Philippe Koheler ('78; France), Eugeni Petrov ('78; Russia), Patrik Sinkewitz ('80; Germany), Pavel Zerzan ('78; Czech Republic), and Charly Wegelius ('78; UK). 8 athletes are making their professional debuts: Cancellara, Eisel, Cheula, Gasparre, Petrov, Rogers, Sinkewitz, and Zerzan. Besides the 8 new pros, 5 more riders are starting their first season wearing the Mapei-Quick Step jersey in 2001 after one or more years on other pro teams: Garzelli, Aggiano, Canada, Horrillo and McGrory. Mapei is welcoming another member to its 2001 team who wasn't competing last year in the Mapei-Quick Step colors, but in his case, it's not a debut, it's a homecoming: it's Franco Ballerini, who raced with the Mapei team for five consecutive years, from 1994 to 1998. Franco can be considered a member of the "Old Guard". Heading the organization that manages the team is, as ever, Aldo Sassi, who is also the coordinator of the Mapei Sport Service in Castellanza (Varese) which provides testing and training programs for the Mapei-Quick Step athletes. Alvaro Crespi is the Team Manager.
Team coaches are Fabrizio Fabbri, Serge Parsani, and Roberto Damiani, along with Jesus Suarez Cueva from Spain, and Eric Vanderaerden from Belgium. This is Vanderaerden's first year as a Mapei coach. Eric was a great champion in the Classic races during his own pro cycling career. Damiani continues as coach of the younger riders. Working with him this year is Josè Antonio Fernandez Rodriguez, better known as "Matxin".
As always, the team pedals on ultra-customized bikes built by Ernesto Colnago in his factory in Cambiago, Italy, with gears by Shimano. Mapei-Quick Step, in collaboration with the Sportful company, has altered the design of its jersey. The "Mapei Blue" is more dominant amidst the ever-present trademark building-blocks. The team has changed its look but not its winning spirit.

THE OLD GUARD MEETS THE NEW

The 2001 Mapei-Quick Step professional cycling team numbers 41 riders on this season's roster. Among its bright lights is Franco Ballerini starring in his very own version of "Return to the Future". Franco is by no means an unknown quantity for the team sponsored by the Mapei Group, having raced with Mapei for several years beginning in 1994, during which time he racked up 5 of his total of 20 victories. Franco won the Paris-Roubaix for Mapei in 1995 and 1998 and had an equally resounding triumph in the Het Volk at the opening of the Belgian racing season in 1995. "I'll compete at least until April," Franco says, "and go for taking the Paris-Roubaix a third time. After that I'll join the management end of the team. Rest assured that I'll be a real rider, not just an honorary one."

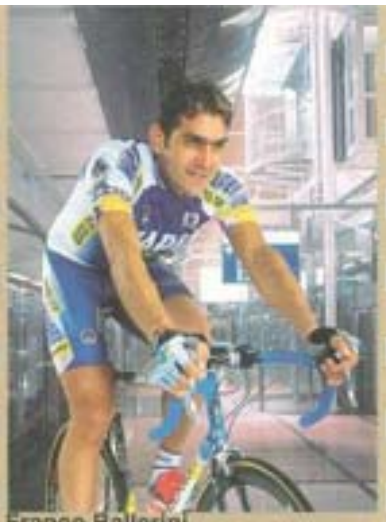
The most important new member of the Mapei-Quick Step 2001 team is Stefano Garzelli. Stefano has a career record of 9 victories, including a stage and the final classification of the 2000 Giro d'Italia. In the last few years Mapei-Quick Step has won many first place victories, consolidating its lead in the U.C.I. rankings.

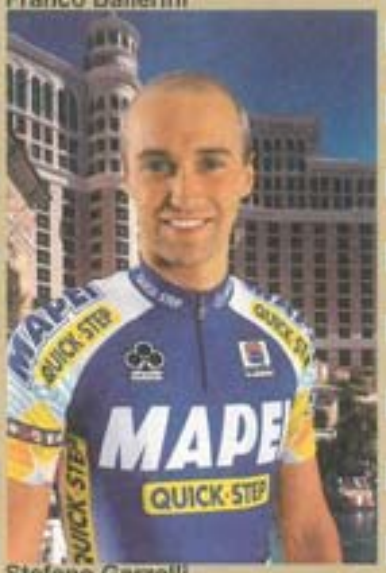
But the Mapei team's only first placing in the overall classification of the Giro d'Italia dates back to 1995 (with Rominger in first place). "Garzelli has the technical ability to win the Giro for us," says Giorgio Squinzi, Chairman of Mapei S.p.A. "He'll make it in 2001. In 2002 he'll shoot for first place in the Tour de France."

"A lot of teams courted me," admits Garzelli, "and they made me some really big offers. I went with Mapei-Quick Step for technical reasons, not really for the financial aspect." Mapei team manager Alvaro Crespi tells us that, "The Giro d'Italia will be the crucial point of the 2001 season for Stefano. There's a possibility that Garzelli may compete in the Tour de France this year just to gain experience."

Among the new Mapei-Quick Step team members are several determined athletes: Elia Aggiano, who boasts 4 wins in the pro category, including one in the year 2000, along with two Spaniards, David Gracia Canada and Pedro Horrillo Munoz. Canada burst on the scene last year, winning 7 competitions. Horrillo has one win to his credit in 2000. Mapei-Quick Step has an Olympic champion on board, Australian track racer Scott Mc Grory who dons the Mapei building-block patterned jersey for the first time this year. Scott distinguished himself on the American team at the Sydney Olympics in tandem with Brett Aitken.

Taking on young riders was an important part of the team's campaign for new acquisitions. Mapei engaged several multi-title winners who are making their professional cycling debuts. Russian rider Evgeni Petrov won 11 races in the year 2000, including the World Pursuit and Time Trial Championships. In the 2000 Under-23 World Championship in Plouay three riders


Franco Ballerini



Stefano Garzelli

Evgueni Petrov

who have since joined Mapei-Quick Step took their places on the winners' podium in the time trial: Petrov in first place, Fabian Cancellara (Switzerland) in second, and Michael Rogers (Australia) in third. Cancellara won the Juniors World Time Trial Championship 2 years in a row, in 1998 and '99. Rogers came in second in the 1999 Under-23 World Time Trial Championship, with Petrov finishing third.

Another new acquisition is Graziano Gasparre, winner of 7 competitions in the year 2000, including the Under-23 European Championship and the Giro a tappe delle Regioni. Gianpaolo Cheula is another athlete making his pro debut, as is Bernhard Heisel from Austria. Bernhard has ridden in 150 races so far, with 11 national junior titles in several categories. Mapei's multi-national group of new professionals also includes Patrik Sinkewitz from Germany and Pavel Zerzan from the Czech Republic.

The average age of Mapei-Quick Step team members is decidedly lower this year with so many young lions joining the roster. Does that mean the old guard is fading away?

No way! Mapei veterans will certainly make their mark in 2001. Andrea "The Gladiator" Tafi and Daniele Nardello are battle-hardened pro's. They've been proud wearers of the Mapei jersey ever since the Mapei Group began sponsoring the team on January 1, 1994. Tafi has won 28 races in his pro career, including a Paris-Roubaix, a Tour of Lombardy, a Rochester Classic and the Paris-Tours. "2001 will be my thirteenth pro season," says The Gladiator. "I know I can still win the big races, most of all the World Cup."

Talented all-round athlete Nardello has won 21 professional victories, including 5 in the year 2000. He knows how to stay out front, whether it's a stage through the Pyrenees in the Tour de France or the finale of a Classic like the Tour of Flanders or the Lombardy. In addition to "The Gladiator", Mapei-Quick Step can still count on Italian Champion Michele ("The Warrior") Bartoli. For yet a third year "The Warrior" has remained a Mapei stalwart. Michele's record totals 41 victories. His Palmares includes 2 Liege-Bastogne-Liege races, a Tour of Flanders, a Swiss Grand Prix and, most importantly, two World Cups, 1997 and 1998.

The booty would have been even richer if the Tuscan rider hadn't broken his knee in a fall during the Tour of Germany in June of 1999. Michele won 3 races in the year 2000.

Paolo Bettini (12 victories in his career, including 6 last year) has the Tour de France on his 2001 agenda. This spring he'll compete in many of the Classics, shooting mainly for a second win in the Liege-Bastogne-Liege. Where winning is concerned, Bettini's forte isn't just quality, it's quantity! Oscar Freire racked up win after win for Mapei-Quick Step in the year 2000, adding 10 wins to his record. In his 13 years as a professional Oscar has won 13 competitions and finished third at the 2000 Plouay World Championship. The most important stage race on his 2001 agenda is the Vuelta a España which will put him in great shape for the Lisbon World Championship.

Belgian athlete Tom Steels boasts 58 victories in the course of his career, including 7 in the year 2000. Tom still shines as the brightest star in the compact group of sprinters in the Tour de France and many prestigious pursuit Classics. Tom joined the Mapei team in 1996. Since then he has scored victory after victory for the Mapei, standing on the winners' podium 50 times wearing the Mapei

jersey, a Mapei Group record previously held by Rominger with 46.
In the Classic pursuit competitions Stefano Zanini continues to embellish his outstanding career record of 23 victories, including 4 in the year 2000. Zanini is the only Italian rider to appear in the gilded record books of the World Cup's Amstel Gold Race which he won in 1996.
Hungarian champion Laszlo Bodrogi, with 7 wins his first year as a professional last year, will no doubt go on to even greater glory this season. Other Mapei team members contributing their strategic talents in the 2001 season include Paolo Lanfranchi who has 4 victories in his career record, including his triumph in the difficult Briancon stage of the 2000 Giro d'Italia, the combative Davide Bramati (6 career wins, including one in the year 2000), Paolo Fornaciari (1), Rinaldo Nocentini (2), Andrea NoË (2 career wins, 1 in 2000), Luca Scinto (8 since his pro debut, 1 last year), and David Tani, along with Belgian rider Bart Leysen, who has 11 overall wins worldwide, and Spanish rider "Triki" Beltran Martinez (3). Mapei athletes competing in their second year as professionals are Dario Cioni (1), Crescenzo D'Amore (1), Luca Paolini (3), Filippo Pozzato, Eddy Ratti, Antoni Rizzi, Belgian rider Kevin Hulsmans (1), Philippe Koehler (France), and Charly Wegelius (UK).
Adriano Baffi, who has been a professional since 1985, boasts 64 successes in road races, including 13 in the "Sei Giorni". Baffi, a cycling powerhouse like his famous father, has been Italian national track-race champion five times in his professional career.

Adriano Baffi


Laszlo Bodrogi

CF1 - THE FORMULA 1 BIKE

Every age has its champion, and every champion has a Colnago. It's a true winner's machine, the bicycle of success. The unmistakable ace of clubs logo of Cicli Colnago of Cambiago, Milan, is the cycling equivalent of Ferrari's prancing horse. And now Colnago has produced yet another jewel, this time in collaboration with Ferrari. The bike, christened the CF1, was presented on 15th September in the Africa Hall at the Milan Exhibition Centre, and was on display for the next four days in the main pavilion of the EICMA 2000 international cycling show.

Ernesto Colnago, the archetypal self made man, is the heart and mind of the Cambiago company, and his fame has travelled far beyond the frontiers of international cycling. In seven years of using Colnago bikes, the professional Mapei-Quick Step team has won 512 road racing competitions and numerous track events. 110 teams have ridden Colnago bikes, but the Mapei-Quick Step squad has given Colnago the most satisfaction.

Both Adriana Spazzoli, Mapei's head of external relations, and Professor Aldo Sassi, manager of the Mapei-Quick Step team, attended the presentation of the of the new Colnago Ferrari in the Africa Hall.

Of course, Ernesto Colnago's name prompted the involvement of Fiorenzo Magni, Eddy Merckx, Vittorio Adorni, Giuseppe Saronni and other champions, all of whom have written their name in cycling history. Ferrari was represented by Antonio Ghini, their Communications Manager. Also present was Vittorio Avogadro, head of the Ferrari Idea section, which handles all non-car racing initiatives involving the Ferrari brand.

Naturally, the debut of the Colnago Ferrari attracted large numbers of VIPs. Costantino Ruggero, Secretary-General of EICMA, described Ernesto Colnago as the constructors' "Champion of Champions". The love story between Colnago and Ferrari blossomed in 1987. At that time the Colnago Ferrari model was named "Concept".

A production run of 500 is intended for the new CF1. Its distribution will be handled by Ferrari dealers and Cicli Colnago. Many Ferrari car owners have already ordered the CF1. Delivery will start in February 2001.

The CF1's weight will range from 7 kilos for the 54 cm frame model (measured from the centre of the crankshaft casing to the end of the vertical tube) to 7.7 for the 56 cm model. The bike will be manufactured with frame sizes of 54, 56, 58, 60 and 62 cm.

The Colnago Ferrari frame is a carbon-fibre monocoque, which strictly conforms to International Cycling Union standards. The optical effect of the two-tone finish means that the colours blend perfectly. The Star carbon-fibre fork lends the bicycle superb manoeuvrability.

MAPEI TROPHY 2001

MEDIA WARS: THE FIGHT IS ON FOR THE MAPEI TROPHY

For the sixth year in a row, Mapei has thrown down the gauntlet: to the mass media, that is. The Mapei Trophy is an international competition in which members of the fourth estate are challenged to scoop each other in predicting the winners of the 2001 pro cycling season.
The contest begins with the Milan-Sanremo (scheduled this year for 24 March) and ends with the Tour of Lombardy.
Contestants simply fill out a form naming the first to fifth place winners in each race. For each correct prediction, the contestant is awarded 7 points for the first place winner, 5 for second, 4 for third, 3 for fourth and 2 for fifth place. Contestants who correctly predict the riders in first to fifth place, but get the finishing order wrong, are awarded one point.
On each entry form is printed the date and time by which it must be received by fax at the Marketing Department of Mapei S.p.A. The Mapei Trophy is bestowed upon the contestant who accrues the greatest number of points.
Lots are drawn in case of a tie.
Previous contests attracted entries from members of the media on two continents.
The Mapei Trophy was founded in 1996. That year the prize was awarded to Pier Augusto Stagi, editor of the monthly magazine "Tuttobici". His Tuttobici colleague, Danilo Viganò, was the 1997 winner.
Freelance photographer Roberto Bettini won the Mapei Trophy two years in a row, in 1998 and 1999. Roberto works for the Olympia agency and his photographs appear in many major daily newspapers and magazines. The Tuttobici team came back to win again in the year 2000 in the person of editor-in-chief Paolo Broggi.
There is, of course, a special prize for the winner.
In order to participate, call the Mapei Marking Department in Milan at 39.02.37673223. Entries should be faxed to 39.02.37673214. The e-mail address is marketing@mapei.it.

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