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RESEARCH AND WORK: OUR FUTURE

Giorgio Squinzi
CEO of the Mapei Group

In spite of the widespread crisis in a number of sectors of industry, and its global impact on an increasingly large percentage of the world's population, Mapei is holding firm and the growth of the Company continues.
Confirmation comes from the latest figures, and further proof is in the new, highly developed products capable of satisfying every requirement and need of all operators in the building industry all over the world.
The consolidated turnover of the Mapei Group for the first 11 months of 2010 increased by 10% with aggregate sales of more than 1.9 billion Euros, which means 173 million Euros in new sales. The best sales performances were achieved in the Asian countries (+32,5%), in Eastern Europe (+14,4%) and in the Americas (+12,1%).
These figures are particularly important and indicate how positive 2010 has been. A sign which, as far as Mapei is concerned, offers hope for the future. And fortunately other sectors of industry have also started to pick up. Even though the situation is different for each sector of industry, we still have not reached the levels registered before the global crisis, and forecasts predict that they will only be reached again in around 2013-2014.
Today, nevertheless, we may affirm that those companies which have exploited research and innovation to the full, as Mapei has done and will continue doing, have found the right key to create growth. Another important point, and which has enabled a number of companies to grow, was the decision to delocalise. This decision is often taken not necessarily to lower labour costs, but rather to be closer to the markets where the goods are destined. A key to growth has been the ability to acquire portions of the market at a global level, as Mapei has so successfully done.
Innovation does not advance by history-making steps or jumps. It is, rather, a continuous evolution, the fruit of hard work, as we do each and every day here in Mapei, which every year presents around 200 new formulas on the market which surpass older products.
And one of the areas in which Mapei excels, thanks to its commitment and effort into Research & Development, is eco-sustainability. To be virtuous in the environmental field is highly worth it, and the following is just such an example for everybody. In the 1990s, the Company was the seventh largest producer of adhesives for textiles in the world. Since the 1970s, when together with ASTM (American Society for Testing and Materials) we developed methods to check the content of volatile organic compounds (VOC) in such adhesives, Mapei has become the largest manufacturer in the world for this field and also the leading supplier for the United States market. We managed to do all this in around 12 years and, thanks to the company philosophy, we are increasing the gap between ourselves and our competitors.
The story of Mapei is a perfect demonstration of how, by being virtuous, enormous commercial advantages become a reality. Floor layers have also chosen the Company for its capacity to innovate and invest in products which have the highest respect for the environment and for mankind.
Mapei is a company which is part of the chemicals sector, and it is important to remember that 2011 is the international year of chemistry, proclaimed by UNO in partnership with UNESCO and IUPAC (International Union of Pure and Applied Chemistry) to celebrate the successes of the chemicals industry and its contribution to the wellbeing of mankind. And Mapei is once again star of the show during the celebrations with innovative, safe and guaranteed products, thanks to its commitment to research.
The forecast for 2011 for the world of chemicals is that there will be less growth compared with 2010, and that this growth will be very "patchy".
The chemicals industry is a supply industry, and before we witness a real recovery in the market, the entire manufacturing sector as a whole must make a recovery. But if we look beyond the forecasts and a cold analysis of the latest figures, one thing is sure, and that is that Mapei will not give up and we know that the winning recipe to overcome the crisis and to carry on growing is only one: to work hard at all levels to be the best and to offer the most satisfying and complete products that the building industry requires.
Obviously with the help of innovation and research, but also through a corporate spirit which supports the complex yet well-organised Mapei company structure all over the world.
Our wish is that everybody can be up to such a challenge, not only for the present, but also for whatever the future may bring.

Giorgio Squinzi

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MAPEI DAY 2011

Bormio, 17th July
Stelvio Pass

Sunday 17th July

PROGRAMME

8.40 a.m. **Ski roll race** (for members only)

8.50 a.m. **Half Marathon** (for members of Fidal or other amateur associations only)

9.00 a.m. **Running Race Open to All**

9.15 a.m. **Re Stelvio - Mapei Competitive Cycle Race – 27th edition**
(for Enti Consulta members only)
Female Cycle Race
By bike and with proper jersey

9.30 a.m. **Re Stelvio - Mapei Competitive Cycle Race 27th edition**
(for Enti Consulta members only)
Male Cycle Race
Mapei Bike Ride (for all those interested, alongside champions of the Mapei Professional Cycling Team and other sport VIPs)

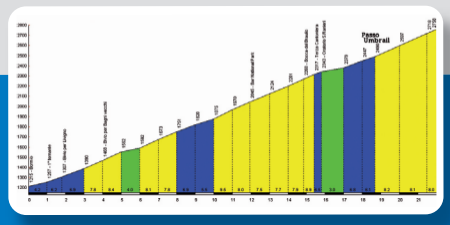
2.00 p.m. **Timelimit Race**

4.00 p.m. **Prize-giving Ceremony** in Piazza Kuerc in Bormio

A free training schedule for runners and cyclists is available from: www.mapeisport.it

COURSE

A 21.097 km climb from BORMIO (1,225 m a.s.l.) to the STELVIO PASS (2,758 m a.s.l.)
Difference in level : 1,533 m.
Starting Line: via al Forte (Bormio City Centre)
From 2.00 p.m. a shuttle bus service will be available from the Stelvio Pass to Bormio.



ENTRIES

from 1st April to 12th July at the web sites www.winningtime.it, www.usbormiese.com, www.popso.it, or else at the Unione Sportiva Bormiese Headquarters via Manzoni - Bormio.
Maximum amount of entries: 3,000

Entry fee: 25 Euros, for entries from 1st April to 30th June.
For entries from 1th July to 12th July, the entry fee is **40 euros** including **Mapei Day jersey**, which you are kindly requested to wear
- Clothes transport service up to the Stelvio Pass
- Refreshment points alongside the course and at the finish line
- Shuttle bus service from the Stelvio Pass to Bormio (for both bicycles and athletes)
- Mapei Day medal
- Photo and race certificate (both available and downloadable at www.mapeiday.com)
- Personal time of the athletes (Winning Time)

N.B. FREE ENTRY on the website www.mapeiday.com for Mapei customers using their customer code and for readers of Realtà Mapei using their Realtà Mapei code

HOTEL INFORMATION

Apt Bormio
Phone number: +39 0342 903300 - info@aptbormio.it
Tourism Bureau: phone number: +39 0342 903300
Special hotel prices for accommodation and lunch at a number of hotels and restaurants.

The event is supported by the Bormio City Council

The event is supported by the Sondrio Provincial Council

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MAPEI®
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MAPEI TO THE FORE IN EUROPE

Mapei's involvement in numerous trade fairs held all over the world and dedicated to all the different sectors of building is part of a very carefully worked out strategy aimed at hitting numerous targets. The Company's presence out in the field and direct contact with current and potential customers are in themselves sufficient reasons for enthusiastically taking up the chance to take part in a trade fair. But that is not all. Although the main aim is to keep the Company at the focus of general attention, it is equally important to see with one's own eyes what the general mood and basic trends are within the sector, taking note of what is happening and assessing the ideal strategies for maintaining the Company's position as a benchmark for everybody operating in the building industry.

The latest editions of Domotex and Bau, trade fairs held in Germany, provided the chance to get a better understanding of where the European building market is heading and how it is happening, most notably in Central Europe, simultaneously assessing how Mapei is getting on.

Domotex, a truly global trade fair, and Bau, a predominantly German event, provided the chance to take stock of the differences between Germany and Italy, the country hosting Mapei Group's headquarters. Despite having two similar types of economy, since both are manufacturing countries whose economies are based on exports, Germany is currently more competitive, while Italy is being held back by tighter constraints connected with the national budget. The first signs of an inversion in trend are just beginning to be felt in Italy, despite a very slow revival which suggests that the building industry will only really start growing steadily in 2012, driven along by a faster recovery in the housing market, whereas civil engineering will maintain its negative trend.

In 2010 the German economy, in contrast, underwent a notable revival, which, helped along by exports, even started to extend to family consumer behaviour and investments. Growth even affected investments in building, which increased in 2010 partly due to resources allocated for infrastructures over the period 2009/10. Let's not forget that, after the boom in this sector from 1990-1998, Germany entered into a period of decline which culminated in an absolute low in 2008/9. The revival should continue in 2011/12 (particularly in the housing sector) but at a slightly slower rate, although still above the average for countries in Euroland. Tiles sales are also expected to grow after an eleven year period of falling demand (the sale of tiles is currently half that of 1997/98).

The Austrian market is quite similar, showing a positive trend in the economy but a real slowdown in the tiles sector. The only real exception among German speaking nations is Switzerland, which has fared well over the last few years and where we are entitled to talk about an authentic boom in building.

As regards the European market as a whole, after hitting rock bottom during the two-year period 2008/9, the curve should rise again from 2011 onwards and building operations in Europe in 2012 should once again grow more quickly than the gross national product, somewhere in the range of 2.5%.

It is worth pointing out that the Mapei Group operates intensively right across the heart of Europe, both directly and through Sopro (owned 100% by Mapei), with three manufacturing plants in Germany, three in Austria and one in Switzerland. An important area confirming the Company's constant growth and positive figures, which I hope will be confirmed in the near future. Mapei and Sopro have increased their market shares and are now the leading companies on the Swiss and Austrian markets and co-leaders in Germany. Important results confirming that the right line of action has been taken, allowing us to expand due to our widespread presence, competitive products and excellent commercial-technical service.

In the rest of Europe too – with the exception of Spain and Italy (where, however, our sales have managed to hold steady and we have actually increased our market shares) – we have grown by 15%, compared to 12% worldwide. The first few months of the year have seen us grow globally by 20%, and it is to be hoped that we can maintain a pre-crisis rate of growth. Positive signs coming from the heart of Europe seem to suggest that we are emerging from the recession. Mapei has never slowed down and is ready, both in Europe and around the world, to keep up the pace, as is only fitting for a real locomotive in the construction and chemical industry.

Giorgio Squinzi
CEO of the Mapei Group

A foreseen growth

The flooring market in German-speaking countries is picking up

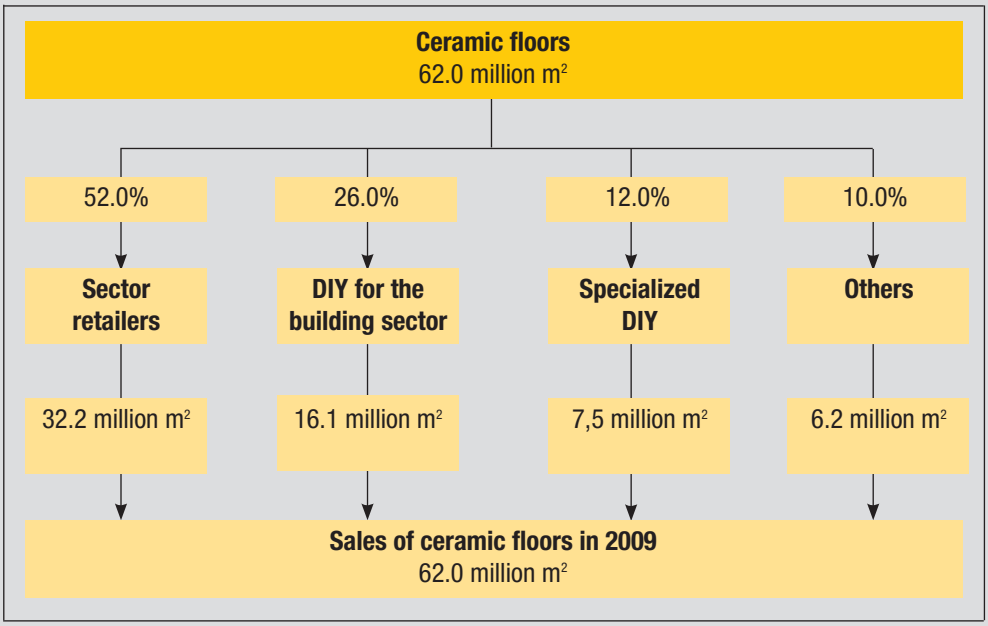
The sales of ceramic floors in Germany, Switzerland and Austria will grow considerably in 2012 to reach a figure of 81.1 million m², while in 2009 the figure was around 77.6 million. This is the forecast according to a study on floor coverings presented by the German editorial group SN-Fachpresse, specialised in interior design, textiles and wood used in architecture.

Sales of floor coverings in millions of m² in Germany/Austria/Switzerland up to 2012

	2006	2007	2008	2009	2010	2011[2)]	2012[2)]
Textile floors[(1)]	166.5	155.6	140.9	131.2	134.7	139.4	141.0
Resilient floors	78.3	79.6	79.0	74.8	74.8	76.8	79.5
Wood and similar products	173.9	140.6	130.9	130.3	132.3	137.3	141.0
Ceramic floors	91.7	88.1	84.8	77.6	77.6	78.8	81.1
Total	**474.4**	**463.9**	**435.6**	**413.9**	**418.4**	**432.3**	**442.6**

1) excluding the automotive sector
2) forecasts

Source: BTH Heimtex/SN-Fachpresse Hamburg



Source: BTH Heimtex/SN-Fachpresse Hamburg

The analysis entitled "The Floor Covering Market in Germany, Switzerland and Austria up to 2012. Sales and Distribution Channels" has been carried out by Carlo Cit, Günther Kelm, Hans Kuipers, Karlheinz Müller and Bernhard ten Hoevel.

For further information:
www.snfachpresse.de
www.fliesenundplatten.de, see "Marktdaten" section
This article was taken from issue n° 1.2011 of the journal FLIESEN & PLATTEN, whom we kindly thank.

The trend for Germany, Switzerland and Austria is more or less the same. For this country, Carlo Cit, who supplied the data regarding ceramic floor coverings, has forecast a growth in the market from 62 million m² in 2009 to 65 million m². Of these, 52% will be sold through specialist distributors and retailers, 26% will be sold through DIY centres for building products, 12% will be sold through general DIY centres and the remaining 10% will be sold through other retailers.

In Germany, Austria and Switzerland the portion covered by ceramic floors in 2009 was 17% of the entire market, with a total volume of 413.9 million m². Textile floors accounted for 31.7%, resilient floors for 18.1%, while parquet, laminates and cork accounted for 35%, with laminates taking the lion's share with 96.4 million m². In 2012 the market should grow overall to a figure of 442.6 million m².

Apart from the data about the overall economic situation, the analysis, which is now at its second edition, also includes detailed information on the various distribution channels and a forecast of the development of the market in Germany, Austria and Switzerland up to 2012.

The study illustrates the overall situation of the market and the situation of each single country. Also, each single product category is split into sales for the residential building sector and the commercial building sector.

DOMOTEX
The World of Flooring

Advances System Solutions

Domotex 2011, the leading international trade fair in the textile, resilient and wooden floors, took place in Hannover (Germany), from 15th to 18th January. As it drew to close, the message was clear: business is back up again for those companies who can foresee future trends and are driven by innovative spirit

True to its forms, Domotex 2011 boasted a high rate of international attendance, with a total of 60% of all visitors coming from outside Germany. In terms of regions of origin, the visitor statistics were roughly on a par with those of the previous year: attendance was up from Eastern Europe as well as from North and South America. This confirms the exhibition as an international event with sufficient scope and reach to be able to bring together the entire global industry and its clientele and to fully highlight the market trends.

40,000 professionals from 87 different countries attended Domotex to sample the latest trends and innovative products for the budding season. A total of 1,350 exhibitors from 70 countries came to Hannover to display a raft of impressive interior decorating trends, featuring new materials, colors and patterns. The exhibition was a complete success in terms of being a trends barometer and business springboard for the international floor coverings industry.

Domotex helped the international carpet and floor coverings industry get the new year off to a solid start. This was a global event where Mapei once again played a major role. Its spirit was certainly shared by Mapei which was present at Domotex once again this year to confirm the importance of investing in research, in order to grow in a market requiring highly innovative technologies and concrete solutions.

Eco-sustainability and New Certifications

At Domotex 2011 Mapei highlighted its international leadership in the production of adhesives and complementary products for the installation of all types of floor and wall coverings. In particular, the Company's solutions includes safe products and systems for laying textile, resilient and wooden floors, certified according to the most stringent international norms and standards.

And with the motto "Advanced System Solutions" Mapei aimed to underline the added value and effectiveness of its systems: innovative, certified systems with low VOC (volatile organic compounds) emission levels which help to spread the use of resilient and wooden materials in modern building.

During this international exhibition in Hannover, Mapei re-proposed the cornerstones of the company philosophy: specialisation, internationalisation and Research & Development. It highlighted that the development of eco-sustainable products is one of the pillars

The 2011 edition of Domotex trade fair totaled 1350 exhibitors from 70 different countries, with 60% of all visitors coming from outside Germany.

Below. At its stand Mapei highlighted plenty of new solutions for laying any type of wall and floor coverings, also using well-attended technical demonstrations.

supporting the Company's growth. We take this chance to remind that every year Mapei invests 70% of the research budget into the development of eco-sustainable products.

This means that around 60 million Euros a year are dedicated to the development of products and systems which are increasingly compatible with mankind and the environment.

This commitment, which dates back to the 1970s, is backed up by increasingly innovative research programmes to develop products with very low emission levels of VOC and without solvents to improve wellbeing in buildings where they are used. All this led to the creation of the ECO range of products, launched in the 1990s on the American market in compliance with CRI criteria and certified by GEV (Gemeinschaft Emissionskontrollierte Verlegewerkstoffe, Klebstoffe und Bauprodukte e.V.), the internationally-recognised association which checks emission levels from products for floors.

Since October 2005, all Mapei eco products have been awarded EMICODE EC1 and EC1 R certification (very low emission level of volatile organic compounds), but the real news as far as the products on show at Domotex 2011 is concerned is the EMICODE EC1 Plus and EMICODE EC1 R PLUS certification, which were both awarded by GEV in June 2010. These certifications offer further proof of the improvement in performance of Mapei products, thanks to the Company's constant, cutting-edge research.

Mapei also works closely with the

Complete Systems
At the 2011 edition of Domotex, Mapei offered a complete overview of its sure, guaranteed and technologically advanced solutions for any requirement or application. The Company'sw communication strategy highlighted the added value offered by a vast range of complete, specific systems for any solution, from substrates to adhesives and varnishes for wood.

Below. Among the Mapei systems in the spotlight at Domotex 2011, one could also find a specific system for laying parquet on uneven heated screeds.

Ultraplan

Ultra-schnell erhärtende, selbstverlaufende Bodenspachtelmasse
VOC-Emissionen, zur Vorbereitung des Verlegeuntergrundes vor der Parkett

***Ultra-fast hardening self-levelling compound**, with very low emission (VOC), preparing the substrates to receive wooden and resilient floors*

U.S. Green Building Council and has been a member for the last 5 years.
This body established the LEED System (Leadership in Energy & Environmental Design) which classifies and certifies eco-sustainable products and buildings according to a special points system.
Mapei is proud of its range which currently includes more than 150 products which meet the LEED requirements and are identified with the "Green Innovation" logo.
A special mention goes to another recent, new certification: Der Blaue Engel, the German ecological label. Both EMICODE and Der Blaue Engel are extremely severe classification systems which assess the potential emission levels of volatile organic compounds from products used in the building industry, on both a short-term basis and a long-term basis from when they are applied.
Only highly specialised laboratories equipped with special, environmental simulation chambers are used for this type of assessment. Der Blaue Engel in particular assesses not only the emission levels of volatile organic compounds, but also the content of substances which are recognised as being carcinogenic, teratogenic or mutagenic and which must not be present in products.
The following four products carry this new symbol: ECO PRIM T (solvent-free acrylic primer for absorbent and non-absorbent substrates), ULTRABOND ECO V4SP (multi-purpose adhesive in water dispersion for resilient floors with a very long open time), ULTRABOND ECO S955 1K (one-component sililate-polymer adhesive without solvents or isocyanates for all types of parquet) and ULTRAPLAN ECO (self-levelling, ultra quick-hardening smoothing compound for layers from 1 mm to 10 mm thick).

Screeds and Self-levelling Compounds
Choosing the most suitable products for substrates, screeds and self-levelling compounds is fundamental to lay floors correctly. Mapei offers a complete range of these complementary products to improve the end result of flooring systems.
In particular, the ULTRAPLAN range is made up of three EC1 products, with ULTRAPLAN ECO ultra-fast hardening self-levelling smoothing compound with a very low emission level of volatile organic compounds worthy of a special mention.

Soundproofing Floors
At Domotex 2010 visitors showed much interest for MAPESILENT SYSTEM, both in its ROLL and PANEL versions. This is a modular system of special panels, sheets and soundproofing accessories which are installed directly in contact with the floor slab before installing the screed. It allows the legal limits for soundproofing against the noise caused by footsteps to be reached by forming screeds which are perfectly isolated from the substrate.
Mapei also presented at Domotex MAPESONIC CR soundproofing membrane in rolls laid underneath the floor. This product is made from grains of cork and rubber

Below. Mapei also presented an eco-sustainable under-floor soundproofing system for laying multi-layer parquet, including MAPESONIC CR and ULTRABOND ECO S955 1K.

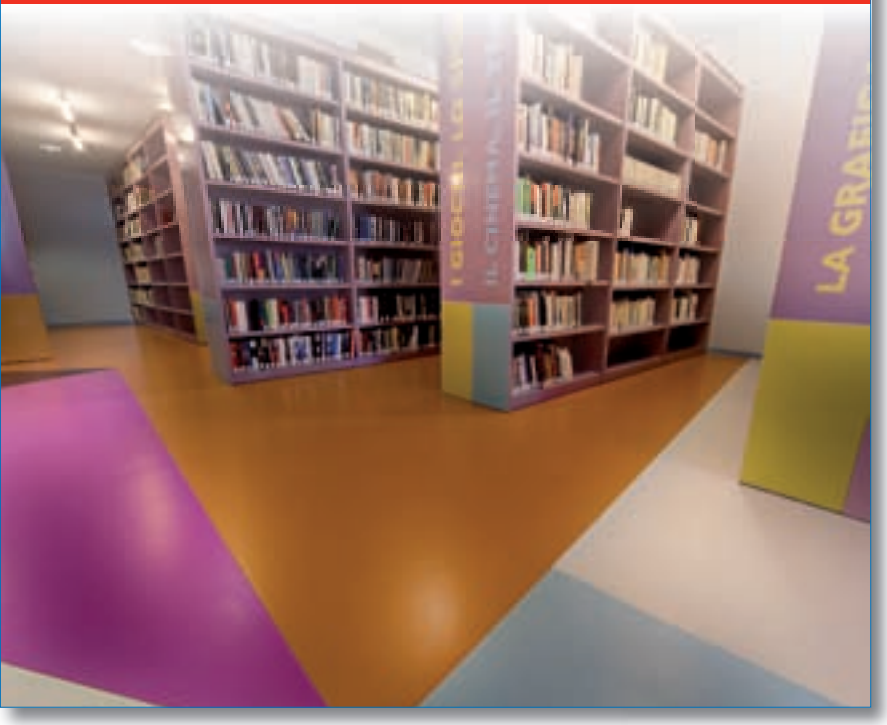
and is laid directly on all types of substrate, including on old floors, before laying any type of flooring material (ceramic, stone, parquet, resilient materials, etc.).

Products for Laying Parquet

ULTRACOAT UNIVERSAL BASE and SILWOOD DECKING stand out particularly amongst the new products presented by Mapei at Domotex 2011. The first product is part of the extensive ULTRACOAT range of oils and varnishes and is a brand new, one-component water-based primer with no NMP (N-Methylpyrrolidone) for wooden floors, certified EC1. The second product is a brand new, sililated polymer sealant without solvents and isocyanates, perfect for sealing all types of internal and external wooden floors, certified EC1R PLUS.

Several Mapei products for protecting and laying wood were on the spotlight, at Domotex 2011 such as the new ULTRACOAT LINE and a complete range of ready-to-use adhesives.

Lovere Library, Bergamo, Italy
Substrates preparation and rubber floors installation with ***Ultraplan Eco, Ultrabond Eco V4 SP***



Products for Laying Resilient Floors

As far as the family of resilient products is concerned, all eyes were on the new product MAPECONTACT reinforced adhesive strip for laying profiles, base-boards, coverings and resilient (PVC, caoutchouc, natural rubber, etc.) and textile coverings on stairs. MAPECONTACT contains no solvents and is supplied ready for use, and rooms where this product is applied may be put back into service immediately, especially when renovation work is carried out.

The product is available in 50 m long rolls in heights of 35 mm, 65 mm, 85 mm and 240 mm and may be applied on cementitious and wooden substrates, ceramic tiles, natural stone, textiles and glass.

Products for Hospital Environments

At this exhibition Mapei also highlighted its wide range of systems for installing floor and wall coverings in hospital environments, where special attention needs to be paid to the effects of the materials on the health of both patients and medical and paramedical staff.

For this kind of application, the

Company proposes EMICODE EC1 and EMICODE EC1 Plus certified products which includes bonding promoter primers, consolidating primers, waterproofing compounds, self-levelling and thixotropic compounds, as well as adhesives for laying rubber, vynil and linoleum floors.

Products for Sports Complexes

Mapei has lately increased its range for sport complexes with the introduction of specific products for various areas of use.

For laying synthetic grass, at Domotex 2011 ULTRABOND TURF PU 1K was presented: this is a brand new one-component, ready to use adhesive launched by Mapei for bonding jointing strips between synthetic grass panels. This product is particularly suitable for bonding at low temperatures and, since it does not require a special hardener, errors during mixing are avoided and it may be used a number of times.

Mapei has also launched the new acrylic and coloured resin system on the market for sports surfaces and tennis courts: MAPECOAT TNS SYSTEM, the coloured acrylic resin product in water dispersion with selected fillers for indoor and outdoor tennis courts and multi-discipline sports surfaces. This product offers excellent resistance to abrasion and to all climatic conditions, to offer a durable protective layer on substrates which withstands the rigours of time.

Alongside the new products, special adhesives for athletics tracks were on show once again, which offer excellent performance opportunities for athletes. Products such as ADESILEX G12 and ADESILEX G19 have been used to bond the athletics tracks for the next Olympic Games in London which are to be held in 2012.

In fact, Mapei is now ready for the 2012 Olympic Games with products and systems for laying indoor and outdoor sports surfaces, synthetic grass playing fields, tennis courts and swimming pools.

Mapei has decades of experience all around the globe in both the construction of new swimming pools and those requiring repair. In fact, since the 1950's, Mapei products have been used to build all the swimming pools used during the Olympic Games and for important international events.

Technical Documentation

Domotex 2011 was also the opportunity to present the broad public Mapei updated documentation, which is available either as a hard copy or from the company website. It includes catalogues for the specific ranges of products for laying parquet, laying on heated floors and soundproofing, for hospital applications and for sports complexes, to propose products which are safe for the environment, floor layers and final users, as demonstrated by their certification. The new selection chart for resilient and levelling compounds has been made much simpler to consult. To choose the most suitable product, it was possible to consult the Mapei Domotex 2011 guide which illustrates all the systems Mapei proposes as the best solutions suitable for each and every requirement.

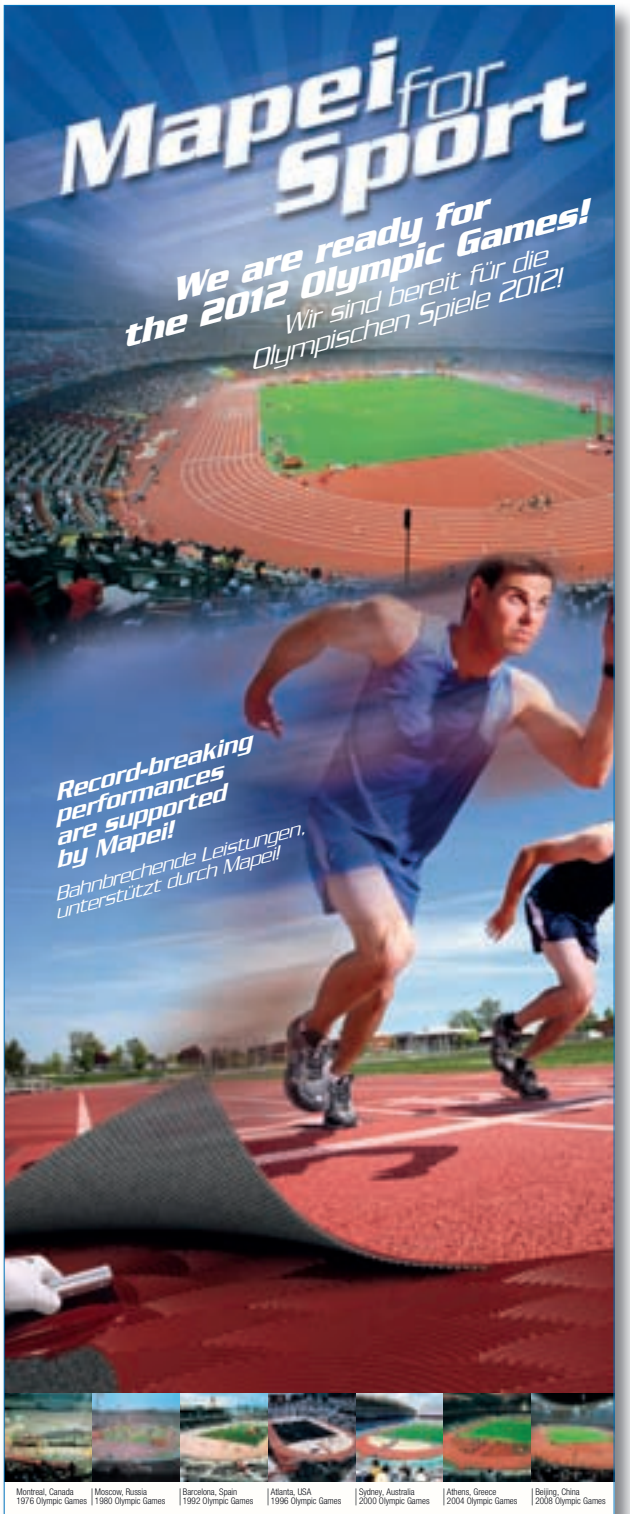
At Domotex 2011 Mapei also presented ULTRABOND TURF PU 1K, a brand new one-component, ready to use adhesive for bonding jointing strips between synthetic grass panels and MAPECOAT TNS SYSTEM, the new coloured acrylic resin system for sports surfaces and tennis courts.

Mapei's presence at this year's Domotex exhibition was particularly important, in that this is the International Year of Chemistry, proclaimed by UNO in partner-

ship with UNESCO and IUPAC (the International Union of Pure and Applied Chemistry) to celebrate the successes of the chemicals industry and its contribution to the wellbeing of mankind (as described in an article at the end of the magazine). And Mapei is once again star of the show with innovative, safe and guaranteed products, thanks to its commitment to research.

The Company's offer at Domotex 2011 can be described by a new version of a famous slogan: Mapei is really "eco-sustainability you can build on".

The next edition of Domotex will once again be held in Hannover from 14th to 17th January 2012.



2012 OLYMPIC GAMES, London.
Since **Montreal 1976** Mapei has been supplying products for laying athletic tracks (Mondo Track FTX with **Adesilex G19**) and building sports facilities and international venues for the **Olympic Games**.

Olympische Spiele 2012, *London.*
Mapei liefert seit den ***Olympischen Spielen*** *von* ***Montreal 1976*** *die Produktsysteme für die Verlegung der Laufbahnen (Mondo Track FTX mit* ***Adesilex G19****), der Sporteinrichtungen und der Veranstaltungsgebäude.*

Summary

IN THE SPOTLIGHT
ULTRACOAT OIL and **ULTRACOAT OIL CARE** page 19, **ULTRABOND P997 1KT** page 23, **ULTRABOND ECO FIX** page 27, **ULTRATOP** and **MAPEFLOOR FINISH 52W** page 32, **KERALASTIC T** page 38, **TOPCEM** page 44, **ULTRALITE S1** page 47, **PLANITOP HDM MAXI** page 56, **MAPEPROOF** page 60, **DYNAMON SR31** page 62, **DYNAMON SP1** page 71.

2011 marks the 150th anniversary of the unification of Italy, and the country organized many celebrating events. Mapei, whose headquarters are based in this country, warmly congratulates Italian citizens living both in Italy and abroa.d.

COVER STORY:
Mapei contributed to building the concrete foundations of wind turbines in the Kisigmànd power park in Hungary, by supplying high performance admixtures for concrete.

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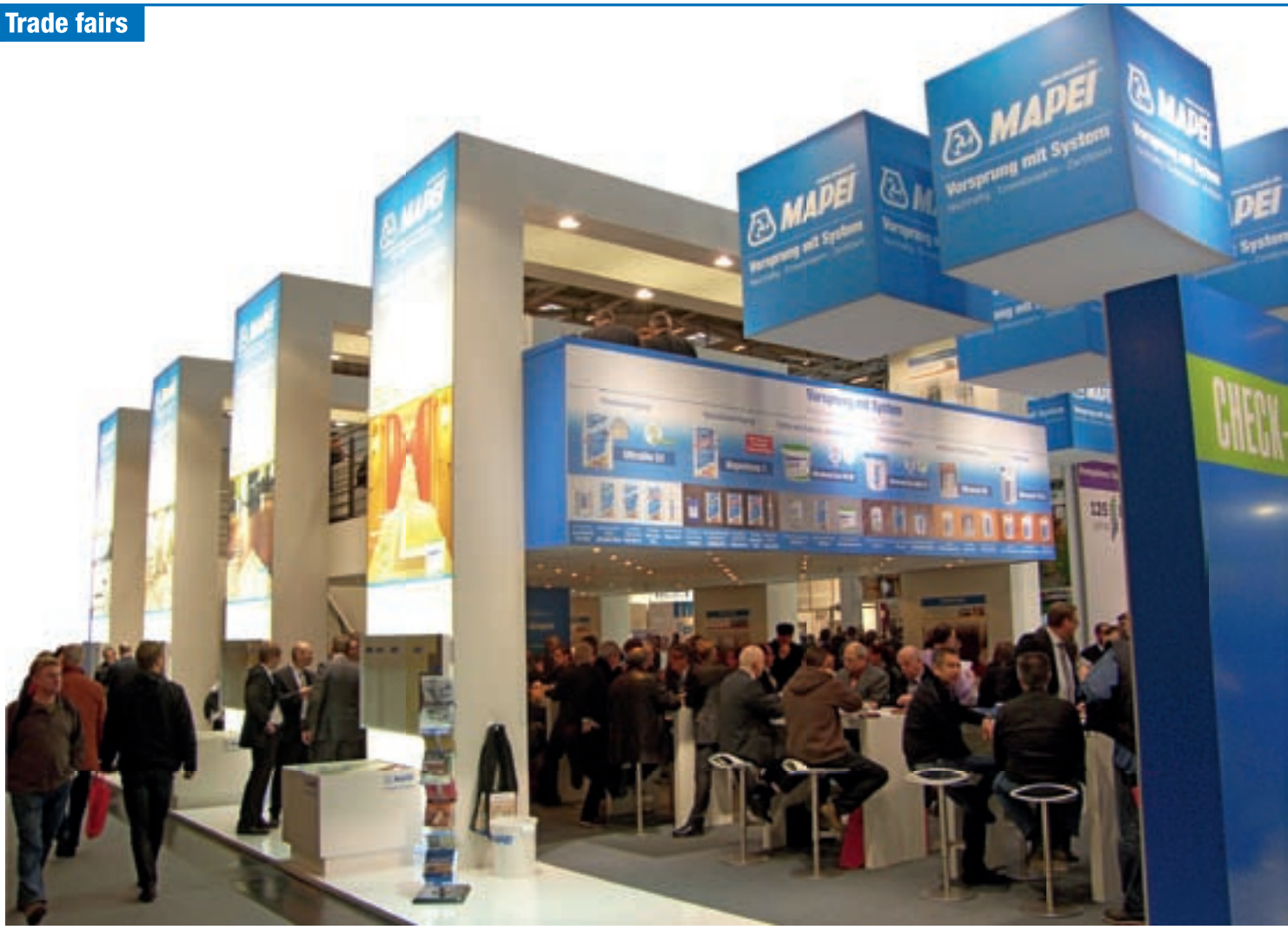
"Responsible Care" is the world chemical industry's voluntary program based on implementing principles and lines of action concerning staff health and environmental protection.



BAU 2011

Innovative and certified products for building

Bau 2011, International Trade Fair for Architecture, Materials, Systems, has experienced a tremendous surge of visitors. Approximately 238,000 visitors streamed into the New Munich Trade Fair Centre from the 17th to the 22th January, around 12% more than the 2009 edition. Never before in the 50-year history of Bau has the event seen such a strong rise. Almost 60,000 visitors from 150 different countries came to Bau 2011 from outside Germany. This boosted the proportion of foreign visitors to 25%, up from 18% in 2009. The project designers and architects attending the fair were + 22% in comparison with the previous edition, totaling 50,000 visitors from this segment alone.

There was also a strong rise in numbers from countries outside Europe, such as India, Japan, the US, Canada and the United Arab Emirates. In some cases here the numbers even doubled.

Spectacular stand designs, full-to-bursting halls, serious business negotiations with well informed customers, plenty of customer inquiries: that was the general picture at Bau 2011. One whole year before the event actually opened its doors, the event was almost fully booked. 2,058 exhibitors from 46 countries showcased their products and solutions on 180,000 m^2 of exhibition space in the halls.

And Mapei also attended the exhibition through Mapei GmbH, the Group's German subsidiary. The Company made the most of this chance to present its wide range of innovative products for building.

The top themes at Bau this year were sustainable building and building for life. On both themes there were several special shows and many lectures in the forums and congresses, for example in the congress entitled 'Building for the Future – Sustainable, Energy-efficient and Innovative', organized by the German Federal Ministry of Building, and the 'Buildings of the Future' events series organized by the German Federal Ministry of Economics.

These are subjects well known at Mapei: the Company, relying on long term experience and constant commitment in Research & Development, is able to offer the most innovative products on the market which are also respectful of human health and environment.

Mapei for Innovative Building

Innovative, certified, eco-sustainable systems for building. These are the main features of Mapei products in the spotlight at Bau 2011, confirming the international Group's leadership in the field of adhesives and complementary products for the building industry.

Mapei is able to offer specific solutions and products for any intervention: from laying ceramic, mosaic and natural stone wall and floor coverings to bonding resilient, textile and wooden surfaces, from laying resin and cementitious floorings to major building projects, from masonry restoration to thermal insulation and soundproofing

interventions, from underground works to wall coatings and admixtures for concrete. At Bau 2011 the Company's communication strategy aimed to underline the added value and effectiveness of its systems: innovative, certified systems with low VOC (volatile organic compounds) emissions, able to guarantee excellent results and one single working partner. This year at Bau Mapei was on show with a vast range of complete, specific systems for any application, from products for substrates preparation (primers, screeds, levelling and smoothing compounds) to adhesives, grouts for joints, varnishes and finishing products.

Products for Screeds

Starting from binders to pre-blended mortars for screeds, Mapei highlighted MAPECEM PRONTO pre-blended, quick-setting and quick-drying (24 hours) controlled-shrinkage mortar which complies with EN 13813 standard, and TOPCEM PRONTO pre-blended, quick-setting and quick-drying (4 days) controlled-shrinkage mortar. This product also has an extremely low emission level of VOC and, consequently, has been awarded EMICODE EC1 R certification by GEV (Gemeinschaft Emissionskontrollierte Verlegewerkstoffe, Klebstoffe und Bauprodukte e.V.), the internationally-recognised body which checks emission levels from products for floors.

Primers

Amongst the primers, Mapei highlighted the ECO PRIM T, a solvent-free acrylic primer with a very low emission level of VOC for absorbent and non-absorbent substrates. This product is especially suitable as bonding promoter for smoothing compounds on residues of old adhesives for resilient and textile floorings. It is EMICODE EC1 and Der Blaue Engel certified.

Self-levelling Compounds

Among the Mapei self-levelling compounds in the spotlight at Bau 2011 one could find the ULTRAPLAN and ULTRAPLAN MAXI, two self-levelling smoothing compounds with a very low emission level of VOC, complying with EN 13813 standard, for thicknesses from 1 to 10 mm and from 3 to 30 mm respectively.

At this exhibition Mapei also presented to the German market PLANITOP FAST 330 quick-setting, fibre-reinforced cementitious levelling mortar for internal and external floors and walls, applied in layers from 3 to 30 mm to even out irregularities.

Waterproofing Solutions

Waterproofing is definitely one Mapei's most successful field of activity.

The Company can offer solutions for every kind of applications: from bathrooms to old terraces, from showers to swimming-pools and roofs.

Among the new products presented at Bau 2011 one finds the PLASTIMUL range. It encloses one- and two-component bituminous emulsions for waterproofing applications, ideal for waterproofing masonry, concrete tanks, cisterns or sump pits for storing water; for protection of concrete gutters and chimney; for waterproofing flat or arched roofs and terraces not subject to foot traffic.

The strong advantage of its products (PLASTIMUL 1K SUPER PLUS, PLASTIMUL 2K PLUS and PLASTIMUL 2K SUPER) is their versatility which makes them suitable for application on a wide range of substrates.

For roof waterproofing interventions, Polyglass was in the spotlight at Bau 2011. This is a company at the very top of the market for manufacturing waterproof membranes and insulating systems for the building industry, which has been part of the Mapei Group since 2008.

Polyglass innovative waterproofing membranes were highlighted, especially those featuring the Reoxthene technology: extremely lightweight (40% lighter than traditional membranes), easy to handle and transport, therefore allowing costs savings,

Cementitious adhesive for low and medium thicknesses, for excellent renovation interventions

Über 150 MAPEI-Produkte unterstützen Architekten und Projektentwickler bei der Realisierung innovativer LEED (Leadership in Energy and Environmental Design) zertifizierter Bauwerke, übereinstimmend mit den Vorgaben des U.S. Green Building Council.

More than 150 Mapei products assist project designers and contractors create innovative LEED (Leadership in Energy and Environmental Design) certified projects, in compliance with U.S. Green Building Council.

GREEN INNOVATION

Flexklebemörtel /*deformable adhesive*

Keraflex Maxi S1

Flexibler, standfester, zementärer Klebemörtel mit verlängerter Offenzeit und Low Dust-Technologie zur Verlegung keramischer Fliesen und Platten, insbesondere großformatiger (Fein-)Steinzeug- und Naturwerksteinbeläge; für Schichtdicken bis 15 mm. Für innen und außen. C2TE-S1 gem. EN 12004.

High-performance deformable cementitious adhesive with no vertical slip, extended open time and Low Dust technology for ceramic tiles, particularly recommended for laying large porcelain and natural stone tiles. It is classified as C2TE S1 according to EN 12004 standard.

Waterproofing Roof Installations

Über 150 MAPEI-Produkte unterstützen Architekten und Projektentwickler bei der Realisierung innovativer LEED (Leadership in Energy and Environmental Design) zertifizierter Bauwerke, übereinstimmend mit den Vorgaben des U.S. Green Building Council.

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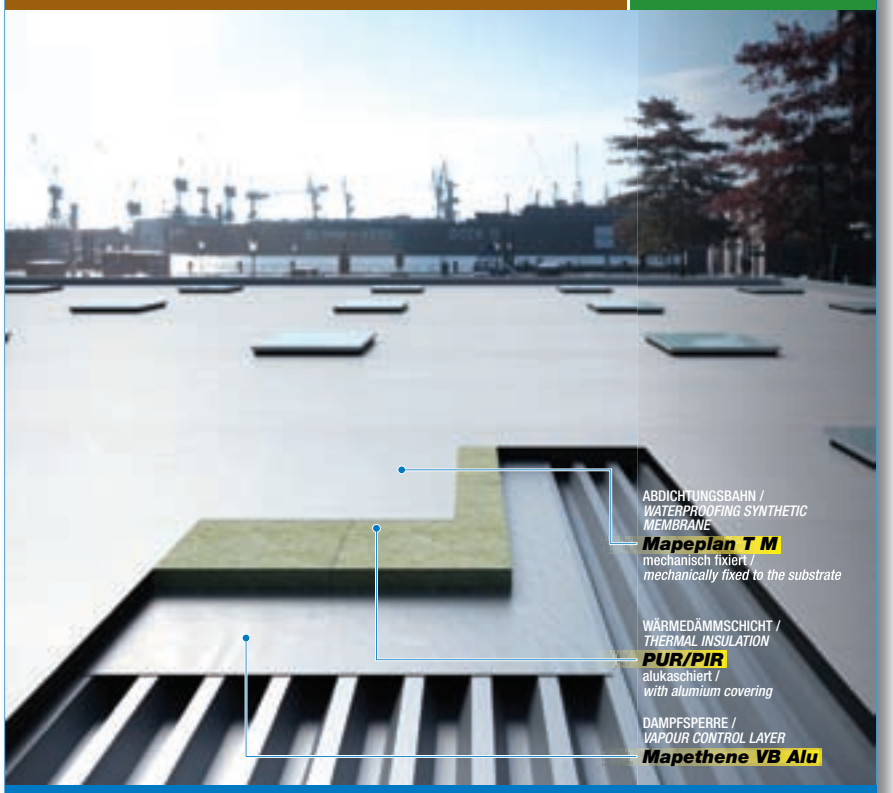
GREEN INNOVATION



shorter application times and safer on-site operations.

Products for Ceramics and Stone Materials

On its stand at Bau Mapei offered a complete panorama of its safe, guaranteed and technologically advanced solutions for laying all types of ceramic: a complete range of products for smaller jobs to major prpjects, to satisfy any requirement that professional layers have to meet in industrial, commercial and residential projects.

The Company's laying systems for ceramic include more than 150 "Green Innovation" products which can contribute points to obtain the LEED (Leadership in Energy and Environmental Design) certification.

Among Mapei eco-sustainable products for laying ceramics and stone materials one finds the KERAFLEX line which encloses eco-sustainable adhesives such as the EMICODE EC1 R-certified KERAFLEX, KERAFLEX EASY and KERAFLEX MAXI S1 featuring Low Dust technology.

Mapei wide range of grouts for joints was also on display. Among them one could find ULTRACOLOR PLUS. This is a EMICODE EC1-certified, fast-setting and drying, high performance, anti-efflorescence, water-repellent mortar grout for joints from 2 to 20 mm. It features DropEffect®, is anti-mould with BioBlock® technology and available in 26 colours.

Among the epoxy grouts on display visitors could find KERACOLOR FF and KERACOLOR GG high-performance, polymer-modified cementitious mortars. All these products are classified as CG2 according to EN 13888 and EMICODE EC1 certified.

Mapei GmbH's participation in Bau 2011 was carefully prepared and managed. The German subsidiary of the Group is also deeply involved throughout 2011 in the "Design Tour for Ceramic Tiles and Natural Stones". This is a German training event intended to widen the knowledge of this field's operators about the most advanced technologies available on the market and the latest tendencies related to this kind of materials. The initiative also includes the presentation of Mapei systems for laying large-size ceramic tiles and stone materials: to this purpose Mapei can again offer reliable, certified, eco-sustainable and long-lasting solutions.

Bau's next edition will take place in Munich in 2013, from 14th to 19th January, as this is a biennial exhibition.

Ultracolor Plus

Application

The grout which prevents the formation of mould in wet environments

Fast setting and drying, high performance grout for joints from 2 to 20 mm

- For interiors and exteriors
- Anti-efflorescence
- Water-repellent with **DropEffect**®
- Anti-mould with **BioBlock**® technology
- Available in 26 colours
- Classified as **CG2** in compliance with **EN 13888**

GREEN INNOVATION

Our environmental commitment
More than 150 Mapei products help project designers and contractors building innovative projects, which are LEED (Leadership in Energy and Environmental Design) certified by the U.S. Green Building Council

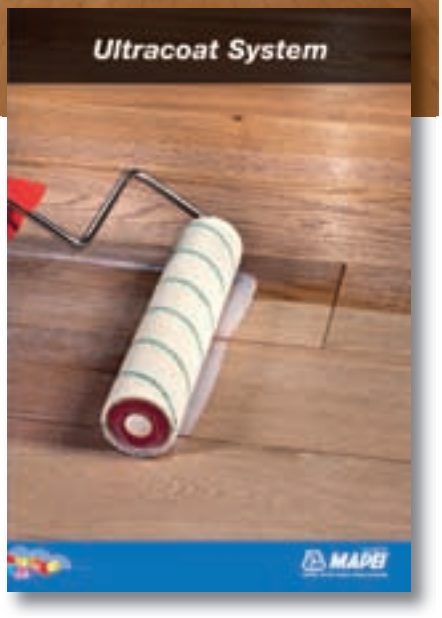
www.mapei.com

MAPEI®

ADHESIVES · SEALANTS · CHEMICAL PRODUCTS FOR BUILDING

Ultracoat Systems

Reliable, innovative, eco-sustainable protection systems for parquet



With the new ULTRACOAT system, Mapei presented at Domotex 2011 a complete range of varnishes, oils, grouts and accessories for parquet which combine perfectly with its innovative adhesives for laying wood. These products are ideal for highly-worn wooden surfaces and guarantee easy application and maintenance and long-lasting protection, even for highly-stressed parquet. In this case too, the motto "Advanced System Solutions" has never been more fitting.

The system is made up of six products. Firstly, there is ULTRACOAT AQUA PLUS solvent-free, water-based binder with a low emission level of volatile organic compounds (VOC), suitable for grouting joints in wooden floors treated with water-based varnish. ULTRACOAT UNIVERSAL BASE and ULTRACOAT P920, on the other hand, are respectively one-component and two-component water-based coats with a low emission level of VOC. There is also a choice of varnishes available, such as ULTRACOAT P915 and ULTRACOAT P925 one-component and two-component water-based polyurethane varnishes respectively, with a very low emission level of VOC and no NMP (N-Methylpyrrolidone) with high resistance to wear and abrasion for wooden floors, and in particular those subject to high pedestrian use.

Amongst the oil resins proposed by Mapei, we can find ULTRACOAT OIL natural drying oil-based resin for treating wooden floors before applying finishing oil, and ULTRACOAT OIL CARE natural drying oil-based resin in water dispersion for finishing wooden floors after the oil treatment. The ULTRACOAT system is completed by SILWOOD acrylic sealant in water dispersion for wooden floors.

Practical Application Examples

These innovative products may be combined in various ways to offer perfect protection for parquet according to each client's specific requirements.

For normal interventions in residential or commercial environments, the easy-to-apply, easy-care "parquet oil system" is an excellent solution. So varnishing is carried out using ULTRACOAT AQUA PLUS, ULTRACOAT OIL and ULTRACOAT OIL CARE. If the floor needs to be protected quickly, on the other hand, for example after restoration or renovation operations, we recommend the "ultra turbo" system which allows surfaces to be subjected to loads after just four hours. This system includes ULTRACOAT AQUA PLUS, ULTRACOAT UNIVERSAL BASE and ULTRACOAT P925.

For floors subjected to heavy loads, the "eco-turbo system" is the perfect choice, and includes ULTRACOAT AQUA PLUS, ULTRACOAT UNIVERSAL BASE and two coats of ULTRACOAT P915. Waiting time before putting the floor back in service and subjected to loads is just six hours.

To protect wooden floors subjected to particularly heavy loads, such as floors in commercial environments, Mapei suggests using the "super protection system", which includes ULTRACOAT AQUA PLUS, ULTRACOAT P920 2K and two coats of ULTRACOAT P925.

Each of these systems is finished off by applying a coat of SILWOOD.

The characteristic of all these systems is their ease of application, which represents a fundamental advantage for floor layers.

Whatever the type of application, therefore, there is a sure, reliable Mapei solution made from innovative, eco-sustainable and easy-to-use products.

Ultracoat line
New system for protecting parquet

Ultracoat Acqua Plus

▶ **Solvent-free, water-based binder** with extremely low emission levels of volatile organic compounds (VOC) and no NMP, mixed with sawdust for grouting wooden floors. Suitable for water-based varnishing cycles.

Ultracoat P920 2K

▶ **Two-component water-based base coat,** with very low emission of volatile organic compounds (VOC) and no NMP, for wooden floors.

Ultracoat Universal Base

▶ **Two-component water-based base coat,** with very low emission of volatile organic compounds (VOC) and no NMP, for wooden floors.

Ultracoat Oil

▶ **Natural drying oil-based resin** used to treat wooden floors with oil-based finishing products.

Ultracoat P915

▶ **One-component, water-based polyurethane varnish,** with extremely low emission levels of volatile organic compounds (VOC) and no NMP, highly resistant to wear and abrasion, for wooden floors. Suitable for floors subject to frequent pedestrian use.

Ultracoat Oil Care

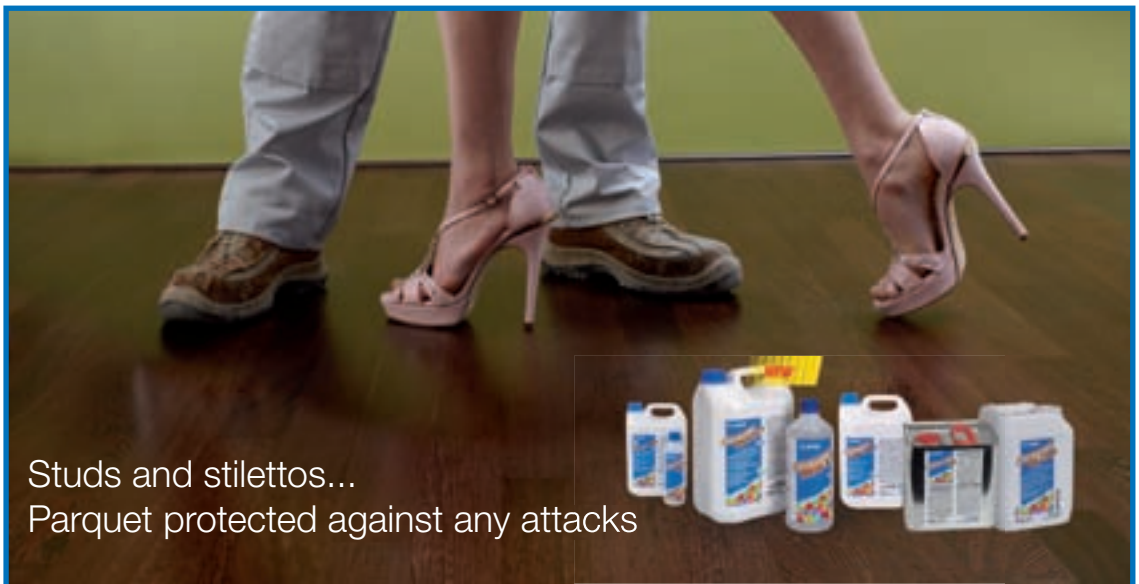
▶ **Natural drying oil-based resin finish in water dispersion** for wooden floors treated with oil.

Ultracoat P925

▶ **Two-component, water-based polyurethane varnish,** with an extremely low emission level of volatile organic compounds (VOC) and no NMP, highly resistant to wear and abrasion, for wooden floors. Suitable for floors subject to extremely high pedestrian use.

Silwood

▶ **Acrylic sealant in water dispersion** for wooden floors.



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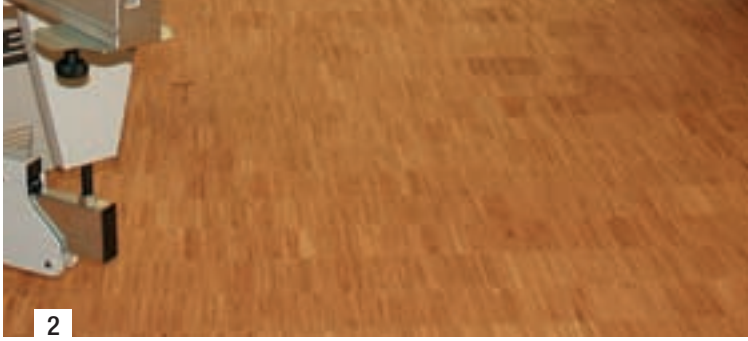

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Photo 1. A view of the outside of the new headquarters of Neureiter Maschinen in Kuchl (Austria).
Photo 2. Inside the factory, on the stairs and in the areas dedicated to sales and the display of machinery and tools, oak floors were laid with Mapei products.

The headquarters of Neureiter Maschinen

Perfectly laid parquet in the Austrian wood-machining company in Kuchl

Mapei's range of products and solutions for laying wood recently grew: ULTRACOAT, a complete range of varnishes, oils, grouts and accessories, has been added to its innovative adhesives, levelling compounds and primers.
An excellent example of the application of a specific Mapei system for laying wood may be found in the town of Kuchl in the Federal State of Salzburg in Austria. Neureiter Maschinen, a company which has been producing machinery and tools for turning wood in this town for 25 years, recently built its new headquarters. It covers 5.000 m² and includes display areas, offices, storage rooms and a demonstration area where all the production, sales, consultancy and training activities are carried out.
For the floor for the stairs and the display and sales areas, which also needed to support very heavy machinery, solid oak flooring was chosen and was laid in a

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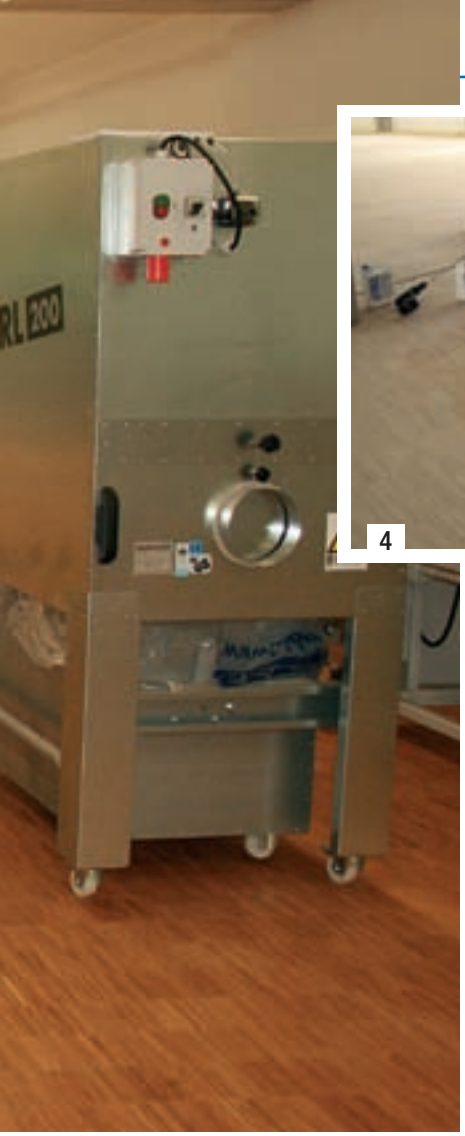

Photo 3. After treating the substrates with PRIMER PA, the parquet was bonded with ADESILEX PA.
Photo 4. After laying the parquet, the floor was grouted with ULTRACOAT ACQUA PLUS.
Photo 5. ULTRACOAT OIL resin was applied using ULTRACOAT ROLLER OIL.
Photo 6. After applying ULTRACOAT OIL, the surface was polished with a buffer machine using white ULTRACOAT PAD disks.
The floor was then polished again with a buffer machine and soft cotton pads to remove the excess oil.
Photo 7. The final treatment of the floor was made by applying ULTRACOAT OIL CARE resin with a buffer machine using a red ULTRACOAT PAD disk.

diagonal pattern over a total area of 1,200 m^2.
The substrate was formed by casting a 20 cm thick layer of concrete incorporating a heating system. The surface was firstly carefully cleaned and then treated with dust-repellent PRIMER PA synthetic resin consolidating and anti-dust primer. This product dries quickly, penetrates into the substrate and guarantees an excellent bond of ADESILEX PA synthetic resin adhesive in alcohol, suitable for laying any type of lamellar, mosaic and slatted parquet, as well as small sized pre-finished parquet strips.
The same adhesive was also used to bond oak parquet in various rooms in the company. After laying the floors, they were grouted with ULTRACOAT ACQUA PLUS solvent-free, water-based binder with a very low emission level of volatile organic compounds (VOC) and no NMP (N-Methylpyrrolidone).
ULTRACOAT OIL natural drying oil resin, was then applied with ULTRACOAT ROLLER OIL short-

IN THE SPOTLIGHT

ULTRACOAT OIL

It is a natural solvent-free drying oil-based resin used for the protective treatment of internal parquet floors in residential environments. ULTRACOAT OIL leaves the floor with a warm, rustic effect and also brings out the natural beauty of the veins in the wood. Apply the product in a single coat using ULTRACOAT ROLLER or ULTRACOAT STEEL SPATULA. On particularly absorbent wooden surfaces apply a second coat after approximately 20 minutes, and in all cases before the first coat dries. Within 60 minutes of applying the product remove excess oil with a cotton rag with the aid of a rotating head fitted with a white ULTRACOAT PAD. After 16 hours, pass over the surface of the parquet with a rotating head fitted with a black ULTRACOAT PAD. Then apply two coats of ULTRACOAT OIL CARE 30 minutes apart using a wax spreader or a rotating head fitted with a white ULTRACOAT PAD and a cotton rag.
It can contribute up to **3 points** for the **LEED** certification.

ULTRACOAT OIL CARE

It is a solvent-free, natural drying oil in water dispersion for final finishing treatments and routine maintenance of wooden floors treated with ULTRACOAT OIL.
It can also be used for repairing small scratches made during laying operations on new wooden floors.
ULTRACOAT OIL CARE used for routine maintenance operations helps maintain the original beauty of wooden floors as when they were originally laid, leaving the floor with a matt finish.
It can contribute up to 2 points for the LEED certification.

8

9

Photos 8 and 9.
Photos of the sales and display areas and the stairs at the end of the laying operations.

haired roller to give the surface of the floor a warm, rustic finish and, at the same time, bring out the natural beauty of the veins in the wood.
The surface was then polished with a buffer machine with special white ULTRACOAT PAD polishing disks. The floor was then further polished with a buffer machine with a soft cotton disk to remove any excess oil. If too much oil is applied, the total drying time increases exponentially, so this phase of the work has to be treated with special care and had to be well scheduled.
ULTRACOAT OIL CARE natural drying resin oil in water dispersion was then used for the final treatment of the floor. In this case it was applied using a red ULTRACOAT PAD to maintain the original appearance of the parquet floor and to eliminate small surface defects.
The use of a complete Mapei system including products for treating the substrate, laying the floor, grouting, varnishing and finishing the parquet, therefore, helped to completely satisfy all the requirements of the client: a wooden floor with a warm, natural effect which, at the same time, was able to support heavy loads. RM

TECHNICAL DATA

Neureiter Maschinen Headquarters, Kuchl (Austria)
Period of Construction: March 2009 - July 2010

Period of Intervention: June 2010
Intervention by Mapei: supplying products for preparing the substrates, laying, grouting and finishing wooden floors
Client: Neureiter Maschinen, Kuchl
Project: Bautechnik Walkner, Kuchl
Contractor: Swietelsky Baugesellschaft m.b.H.
Laying Company: Wimmer Holz
Laid Materials: oak parquet
Works Direction: Ludwig Neureiter
Mapei Co-ordinators: Helmut Schweda and Reinhold Stinzl, Mapei GmbH (Austria)

MAPEI PRODUCTS

The products mentioned in the article belong to the “Products for the Installation of Wooden Floors” line. The technical data sheets are available at the web site: www.mapei.com. More than 150 Mapei products contribute points to obtain the LEED (Leadership in Energy and Environmental Design) certification.
Adesilex PA: synthetic resin adhesive in alcohol for bonding lamellar and slatted wooden floors.
Primer PA: synthetic resin consolidating and anti-dust primer in solvents for cementitious substrates, applied before bonding parquet with Adesilex PA.
Ultracoat Acqua Plus: solvent-free, water-based binder with very low emission level of volatile organic compounds (VOC) and no NMP, mixed with sawdust for grouting wooden floors. Suitable for water-based varnishing cycles.
Ultracoat Oil: natural drying oil resin for treating wooden floors with an oil finish.
Ultracoat Oil Care: natural drying resin oil in water dispersion for finishing wooden floors treated with oil.
Ultracoat Pad: pads used for polishing and cleaning parquet floors.
Ultracoat Roller Oil: short-haired roller (2.5 mm) recommended for applying ULTRACOAT OIL.

Mapei Products for Laying Parquet

PRODUCT **SELECTION CHART**

- ● Recommended by Mapei
- ◦ Small formats (refer to Technical Data Sheet)
- ✚ Lay with beads of adhesive
- ▲ Medium formats (refer to Technical Data Sheet)
- ■ For fixing elements in place which are not perfectly anchored to the substrate

	SUBSTRATES								
	Internal								External
	Mosaics (EN 13488)	Solid wood without joints (EN 13227)	Solid wood with joints (EN 13226)	Pre-assembled tops (EN 13629)	Multi-layered elements (EN 13489)	Laminated and floating	Wooden base-boards	Stairs	External
Adesilex D3						●			
Adesilex LC/R	●	●			●◦				
Adesilex LC/RP	●	●			●◦				
Adesilex PA	●	●		●	●				
Lignobond	●	●	●	●	●				
Ultrabond Eco 575							●		
Ultrabond Eco P992 1K			●	●	●				
Ultrabond Eco S945 1K	●	●▲	●▲	●	●				
Ultrabond Eco S955 1K	●	●	●	●	●				
Ultrabond P990 1K			●	●	●		●		
Ultrabond P902 2K	●	●	●	●	●				
Ultrabond P913 2K	●	●▲	●▲	●	●				
Ultrabond P997 1K T				●✚	●✚		●✚	●✚	
Ultrabond P-R9	●■	●■	●■	●■	●■				
Ultrabond S965 1K	●	●	●	●	●				●

PRODUCT **CERTIFICATIONS**

	EC 1	EC 1	EC 1	EC 1		
SILWOOD		●				●
ULTRABOND ECO 575	●					●
ULTRABOND ECO P992 1K		●				●
ULTRABOND ECO S945 1K				●		●
ULTRABOND ECO S955 1K			●		●	●
ULTRABOND P990 1K				●		●
ULTRABOND S965 1K			●			●
ULTRACOAT P915		●				●
ULTRACOAT P920 2K				●		●
ULTRACOAT UNIVERSAL BASE		●				●

The Galeries Lafayette in Nantes

Oak parquet and Mapei products for renovating an elegant store

The French chain of department stores Galeries Lafayette has been famous for more than a century for variety and quality, and the goods on offer include the most prestigious fashion brands and beautiful furnishing and household products, and often include the most important trends in these sectors. The chain, which has department stores in all the major French cities, has had a renovation programme underway for several years for around 60 of their stores to increase the comfort and surroundings for the clients.
Between November 2009 and March 2010, it was the turn of the store in Nantes to be renovated, a town in the western part of France on the banks of the River Loire.
In particular, the area on the third floor dedicated to crockery and articles for children was replaced by an area dedicated exclusively to men's fashion. The floor was

Photo 1. The entrance to Galeries Lafayette in Nantes.

3

Photos 2, 3 and 4. The floors on the third floor were covered with oak parquet bonded with ULTRABOND P997 1KT.

laid with elegant oak parquet with a warm, luminous finish. Oak is a light-coloured wood with mellow colours and light veining which fits in perfectly with the furnishings. Very solid and resistant, it is the perfect choice for areas subjected to intense foot traffic.

Substrate: from Preparation to Smoothing

The old floor, covered with parquet, tiles and carpet, was completely removed and the surface was planed. The old substrate of concrete slabs was covered with a layer of PRIMER G to get a better bond with the smoothing layer. This ready-to-use primer, particularly suitable for porous substrates, is easy to apply and dries very quickly. PRIMER G contains no solvents and is certified EMICODE EC1 (very low emission level of volatile organic compounds) and is, therefore, a product which respects the environment and, what is more important, the health of floor layers.

MAPESOL 3 was then applied over the entire surface. This high-performance smoothing compound is certified CSTB P3 according to the French norm established by the Centre Scientifique et Technique du Bâtiment (CSTB) and is distributed on the French market by Mapei France, the French subsidiary of the Group. The equivalent product on the international market is known as PLANO 3. These products must be applied in layers from 3 to 10 mm thick and form an excellent smoothing layer with a perfect finish.

IN THE SPOTLIGHT

ULTRABOND P997 1KT

It is a thixotropic, polyurethanebased, moisture curing adhesive used for bonding and shimming wooden steps and profiles on all types of substrate. It is single component, ready-to-use and therefore does not require a catalyst and a successive mixing cycle. The product is available in aluminium tubes for easy application with a special extrusion gun. It is thixotropic and can be applied in thick layers on both horizontal and vertical surfaces. The expansion rate of the adhesive is extremely low, even when applied in thick layers, and has no effect on the alignment of the steps which are laid. It is used to form a bead underneath three-layered parquet, it forms a flexible layer which reduces noise caused by footsteps. ULTRABOND P997 1K T is hypo-allergenic, suitable for floor layers allergic to epoxy and epoxy-polyurethane products. Its packaging features eco-sustainable aluminum soft cartridges.

It can contribute up to **3 points** for the **LEED** certification.

Laying Parquet with Beads of Adhesive

Parquet with a strip size of 12.5 x 120 cm was bonded using ULTRABOND P997 1KT one-component, ready-to-use polyurethane adhesive.

The product is suitable for bonding all types of wooden parquet and compensates for small irregularities on the surface of the substrate. It is also ideal for bonding large-sized wooden skirtings.

When it comes into contact with the humidity in the air, ULTRABOND P997 1KT hardens quickly and forms a shear-resistant flexible film.

Richard Nauleau, director of the company which has laid the parquet, said of the adhesive: “It was the first time we had used this product. I was afraid that the beads would be too weak to ensure a perfect bonding but that did not happen, and I am completely satisfied with the final result. I know Mapei and their products very well. And Mapei’s technicians have always been of great help, offering precise solutions for well-defined prob-

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lems. Their speed when answering my questions is exactly what I'm looking for in a supplier!" To remove traces of adhesive from hands, CLEANER H damp wipes were used. There is no need to rinse hands after use and they also help to protect the skin: a quick, practical solution for site use.
The new parquet has given a warm, modern touch to the new areas in the Galeries Lafayette department store, a high quality project where Mapei also played their part.

We would like to thank Richard Nauleau from the flooring company Le Parqueteur Vendéen and Galeries Lafayette for their kind help in writing this article.
This article taken from issue n° 30/2010 of "Mapei et Vous", the in-house magazine of Mapei France, the French subsidiary of the Group, whom we would like to thank.

Photo 5. Before laying the parquet, the substrate was smoothed over with MAPESOL 3, a product available only on the French market. The equivalent product on the international market is known as PLANO 3.
Photo 6. Following a request from the architect, a special template was used to form exactly the same gap between each parquet strip.

TECHNICAL DATA

Galeries Lafayette, Nantes (France)
Period of the Intervention: 2009-2010

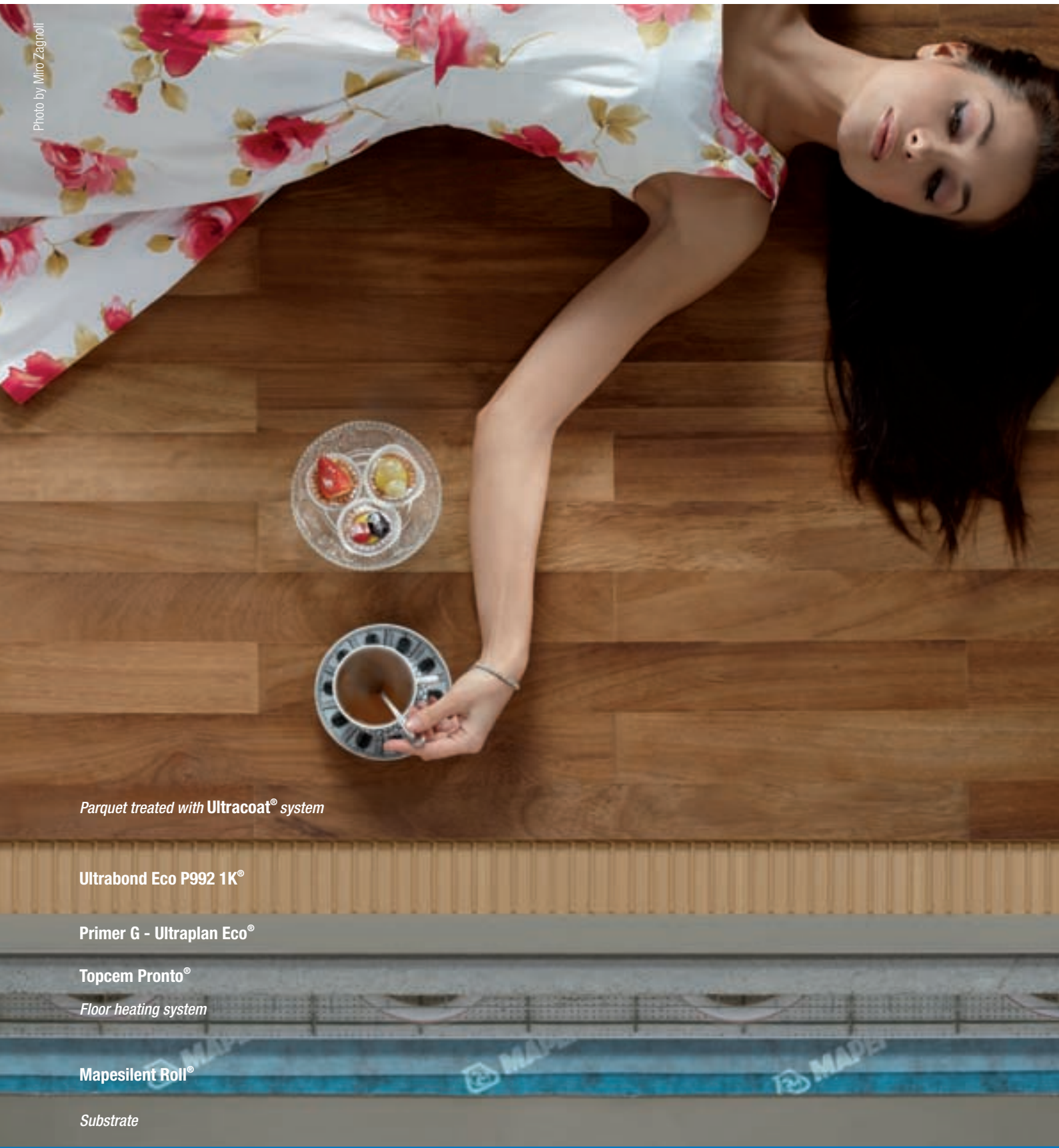
Intervention by Mapei: supplying products for preparing substrates and laying wooden floor
Client: Galeries Lafayette, Paris
Project: Aura, Nantes
Laying Company: Le Parqueteur Vendéen, La Chaize Le Vicomte
Laid Materials: parquet by Orféo Chêne Nature
Works Direction: Socotec, Nantes
Mapei Co-ordinator: Bruno Rautureau, Mapei France

MAPEI PRODUCTS

The products mentioned in the article belong to the "Products for the Installation of Wooden Floors" line. The technical data sheets are available at the web site: www.mapei.com. Mapei levelling and smoothing compounds and pre-blended mortars for screeds conform to EN 13813 standard and have been awarded the CE mark in compliance with annex ZA, standard EN 13813. Almost all the Mapei products for laying floors and walls are also GEV-certified and have been awarded the EMICODE EC1 ("very low emission level of volatile organic compounds") mark, awarded by GEV. More than 150 Mapei products contribute points to obtain the LEED (Leadership in Energy and Environmental Design) certification.
Cleaner H: damp wipes for cleaning hands.
Mapesol 3: high-performance self-levelling smoothing compound for thickness from 3 to 10 mm. It is classified as SCTB P3 according to the French standard UPEC, set by CSTB (Centre Scientifique et Technique du Bâtiment), the French Scientific and Technical Centre for Building. N.B. This product is distributed on the French market by Mapei France, the local subsidiary of the Mapei Group. Plano 3, available on the rest of the European market, is Mapesol 3's counterpart.
Primer G (EC1): synthetic resin primer in water dispersion with a very low content of volatile organic compounds (VOC).
Ultrabond P997 1K T: one-component, solvent-free, ready-to-use flexible thixotropic polyurethane adhesive for all types of parquet. Ideal for laying wooden steps for stairways.

Systems for laying radiant and soundproof floors

Systems for laying radiant floors and for soundproofing against the noise of footsteps.
Mapei offers cutting-edge technologies and innovative systems to construct any type of radiant and soundproof floor, guaranteeing stability, excellent flexibility and a long service life for the floor.



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SAP Italia

Mapei helps the new headquarters located in the Energy Park obtain LEED certification

The new high-tech Energy Park, built according to cutting-edge technological standards as regards both environmental sustainability and the rationalising of energy consumption, is located in a strategic position in relation to the main communication links in the north-east of Italy (eastern highway around Milan and A4 motorway). The site covers a total area of 160,000 m², of which over 57,000 m² will be built on and divided over five new properties.

The first of these officially opened in December 2009 - covering 11,500 m² - which is over half occupied by the new Italian headquarters of SAP, world's leading company in business management software solutions, applications and services, and also an important partner in this business project, which aims to become a focal point for highly innovative and technological companies operating in the area to the north of Milan.

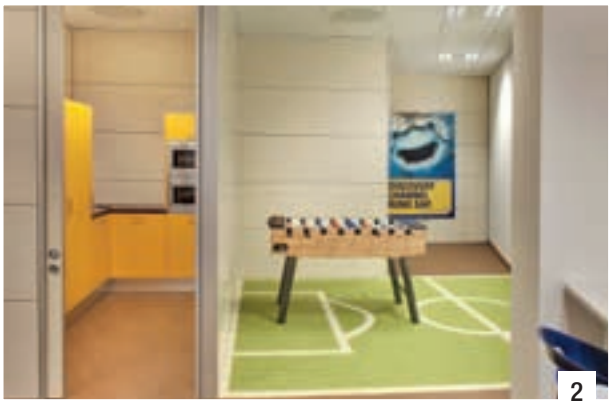
Both the building already constructed – known as Building 03 – and the next four to be built were designed based on the principles of eco-sustainability and the rationalising of energy consumption. When it has been completed, the business site will offer a range of communal services, such as a canteen, medical clinics, bank outlets, bars, meeting rooms, nursery, shuttle bus and video surveillance service.

LEED Certification

Over recent years lots of Italian manufacturing companies have converted from "heavy" industry to "light" manufacturing, based around smaller premises and maximum flexibility in terms of internal layout. Some of these new enterprises have successfully tried to relocate on "old" industrial sites which have been regenerated.

This was also the case with Vimercate Energy Park near Milan, built alongside the Italian headquarters of the French company Alcatel Lucent. The existing buildings, constructed in the 1970s and mainly consisting of single-storey high energy consumption warehouses, were no longer capable of meeting more flexible and dynamic business requirements.

The project's clients found that this area was the ideal place for building the Energy Park, somewhere which could already boast a real vocation for industry and manufacturing. They commissioned the architectural designers to come up with a suitable solution for their needs, so that they could offer any interested companies a highly rationalised program of management and energy costs, as well as a pleasant work environment equipped with functional interior spaces. The first building to open is a construction which stands out for its simple design. Its exterior is cov-



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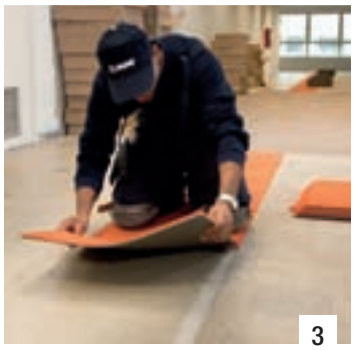

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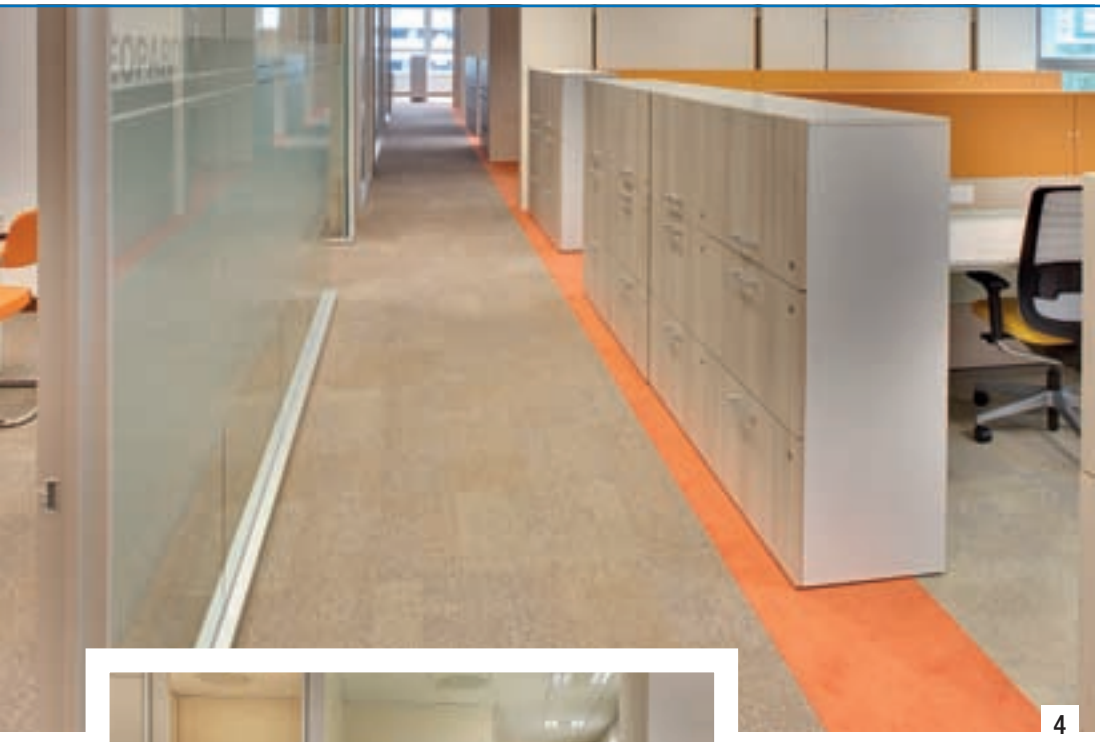
Photo 1. View of Building 03 in the Energy Park in Vimercate (near Milan, Italy).
Photos 2 and 3. Carpet tiles were bonded on the raised concrete floor with ULTRABOND ECO FIX adhesive.
The photos show two different phases of the installation works.



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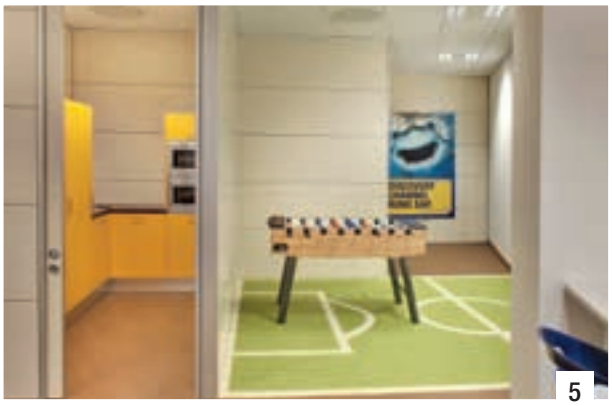
latest generation of cooling and heating systems with condensed heat pumps operated by groundwater, the re-usage of the condensation water for irrigation purposes and flushing the toilets, and the reintroduction of rainwater into the ground so as not to jeopardise the drainage system. The new property's attention to energy rationalisation meant it could be registered with the US Green Building Council, qualifying it for obtaining prestigious **LEED-CS** (Leadership in Energy and Environmental Design for Core & Shell buildings) **Gold certification**.



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Photos 4, 5, 6 and 7. Colored carpet floors were laid in several working and support areas, by using Mapei products.

ered with moulded and perforated steel panels and bow windows with wooden frames. The interior has spacious open premises offering a direct view towards the outside spaces, extremely tall working areas, excellent soundproofing properties as regards the installed materials, and optimum exploitation of natural lighting thanks to a careful balance between external and artificial light.

Right from beginning the design concept and actual development of the Energy Park were targeted at achieving energy savings and environmental sustainability. These goals were met by creating façades with ventilated walls composed of pre-cast reinforced concrete panels, thermal insulation, an external finish using moulded perforated steel panels, solar protection using fixed external shutters, glazed apertures based on a BMS remote-controlled curtains system capable of controlling natural lighting inside the premises, the use of natural and recyclable materials like wood (used for both the lobby spaces and internal covering), the

IN THE SPOTLIGHT

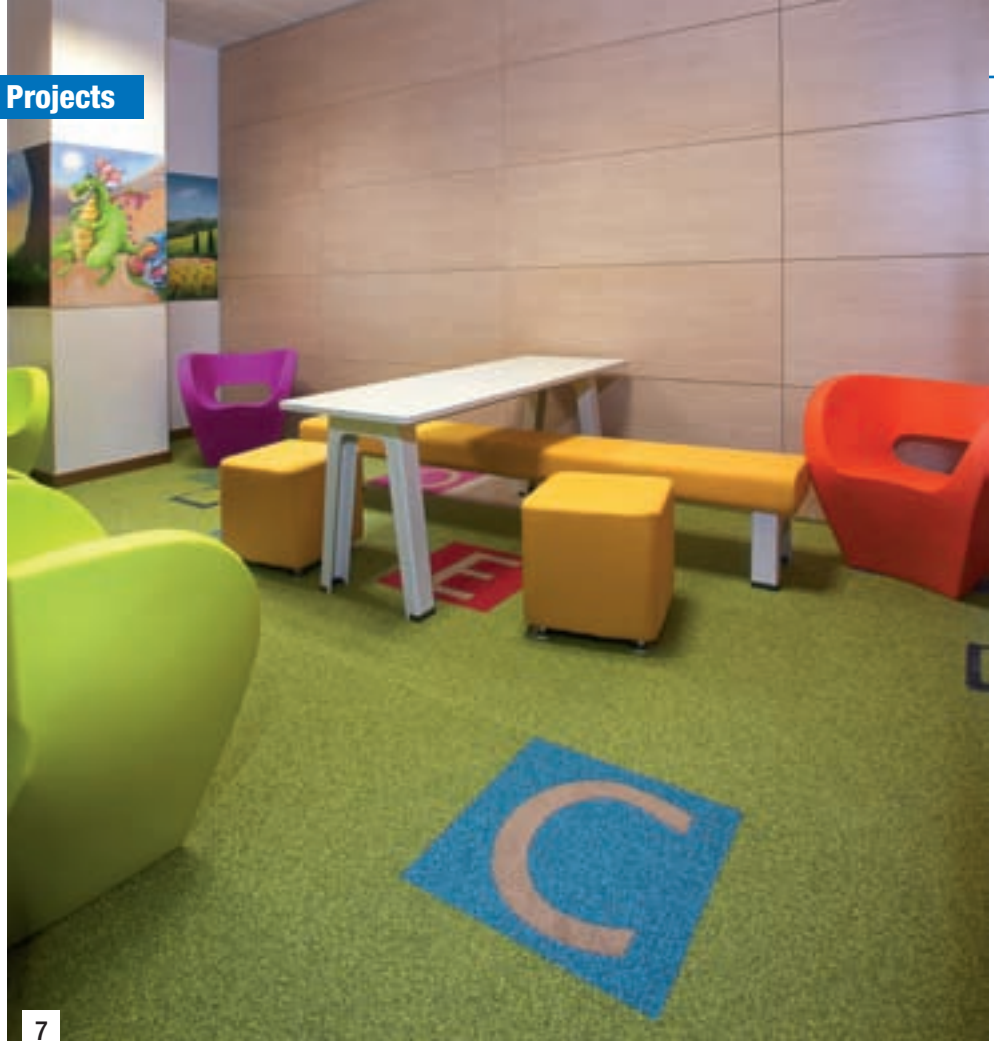
ULTRABOND ECO FIX

It is a solvent free adhesive based on acrylic resins in water dispersion, formulated as an easily trowelable light cream paste, for application by roller, brush or trowel.

ULTRABOND ECO FIX is ideal for antislip bonding of dry-lay carpet tiles with all types of backing, dry-lay PVC tiles with PVC latex mousse backing and venetian carpets on all normal substrates used in building (as long as they are moisture-stable); on existing floors of every type (wood, PVC, rubber, semi-flexible vinyl, linoleum, ceramic, marble, etc.); on raised floors of every type. When dry, the ULTRABOND ECO FIX film remains permanently tacky, even after repeated removal and successive relaying of the floor tiles; it is therefore possible to remove or substitute the flooring easily.

It can be used in areas with heavy foot and normal wheeled chair traffic. ULTRABOND ECO FIX is not inflammable with very low emissions level of volatile organic compounds (**EMICODE EC1** certified), so it is absolutely harmless to the health of the floor-layer and the end-user. It can be stored with no particular precautions.

It can contribute up to **3 points** for the **LEED** certification.



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LEED certification is a system for assessing the performance ratings of a building which qualify for obtaining credits for meeting eco-sustainable standards in terms of the building's design and construction; it "accompanies" buildings from the very start of the design process right until they are fully finished. More specifically, the LEED Core & Shell section encourages building contractors to make eco-sustainable choices, so that future tenants can benefit from them.

Mapei Plays its Part

Just like the exterior designed by Studio Garetti, the interior concept of the SAP Italia headquarters was also "custom-designed" by Archilabs to meet the clients' needs: the whole of Building 03 reflects a project geared to environmental sustainability and new business demands. The offices are constructed over three levels covering a total of approximately 6000 m² and the workspaces focus on sharing. The open space zones incorporate "work boxes" (multi-purpose areas for holding informal meetings) and "touchdown" sections (areas devoted to short work operations). A number of support areas have also been incorporated for carrying out specific duties: brainstorming areas featuring walls which can be written on and informal installations, quieter rooms providing a peaceful and relaxing environment, a SAPteca (library, newspaper library and internal video library), a training centre equipped with modern reconfigurable rooms, a coffee bar area and a customer area with special dedicated rooms and mobile walls, which can be packed away to make it easier to reconfigure the spaces.

Alongside the work areas, special zones have also been provided for break periods: lounges, coffee break points, a family room designed for parents-staff who need to spend short periods of time at the company with their own children, and a refreshments area equipped with a kitchen, automatic dispensers, a games area (Wii, PlayStation 3 and table football) and a reception area. The materials and forms used for the furbishing of the new headquarters helped create a comfortable environment and sense of well-being based around warm and welcoming premises, natural colours and harmonious features.

Mapei also took part in this interesting and innovative project providing the adhesive for laying the sections of carpet tiles (5000 m²) and dry-lay PVC tiles (300 m²) in the various work spaces. In order to conform with the parameters set by LEED Gold certification, Mapei's Technical Service Department team recommended using ULTRABOND ECO FIX, a solvent-free adhesive in water dispersion. This is a not inflammable adhesive with very low emission level of volatile organic compounds (EMICODE EC1 certified), which means it is absolutely harmless to the floor-layers and the people eventually using the premises where it is installed. The tiles were laid on a raised floor covered with concrete panels. So Mapei made its own contribution not just to creating the new SAP Italia headquarters in the innovative high-tech Energy Park in Vimercate, but also by helping it **obtain LEED Gold certification**.

TECHNICAL DATA

SAP Italia New Headquarters, Energy Park, Vimercate (Province of Monza and Brianza, Italy)
Period of Construction: 2009/2010
Period of the Intervention: 2009/2010
Intervention by Mapei: supplying products for laying moquette tiles
Project: Studio Garetti (Milan); Archilabs (for interior design)
Client: Segro Italy (Milan)
Works Direction: Riccardo Minelli
Contractor: Cooperativa CESI (Modena, Italy)
Laying Company: Centro Distribuzione Pavimenti di Aramini (Milan)
Laid Materials: carpet tiles by Interface, PVC tiles by Forbo
Mapei Distributor: Centro Distribuzione Pavimenti di Aramini
Mapei Co-ordinator: Angelo Nobili, Mapei SpA (Italy)

MAPEI PRODUCTS

The product mentioned in the article belong to the "Products for the Installation of Resilient and Textile and Floor and Wall Coverings" range. The technical data sheet is available at the web site: www.mapei.com. Almost all the Mapei products for laying floors and walls are also GEV-certified and have been awarded the EMICODE EC1 ("very low emission level of volatile organic compounds") mark by GEV.

More than 150 Mapei products contribute points to obtain LEED (Leadership in Energy and Environmental Design) certification.

ULTRABOND ECO FIX (EC1): solvent-free adhesive in water dispersion with permanent tack and very low emission level of VOC for dry-lay floor tiles.

Certification-proof

We don't just say green, we live it.

You have to believe, invest in research and have your products certified by official, internationally-recognised organisations to make eco-sustainable projects.
Mapei does not invent certification; it is awarded to Mapei all over the world.

Products containing recycled, ultra-light materials
(LEED USGBC rating: **MR Credit 4**)

The maximum use of recycled materials in the composition and packaging of Mapei products

Products with a very low VOC content
(LEED USGBC rating: **EQ Credit 4.1, 4.2** and **4.3**)

Mapei adhesives are certified Green Label Plus, EC1

Special care for the air you breathe
(LEED USGBC rating: **EQ Credit 3.2**)

Compared with conventional Mapei cementitious adhesives, our products with Low Dust technology reduce the amount of dust given off into the air in closed environments during mixing and application by up to 90%

Local production sites
(LEED USGBC rating: **MR Credit 5**)

Reduce impact on the environment by reducing the need for road transport

Products developed to reduce energy consumption

Mapei offers numerous solutions to reduce energy consumption and systems specially designed for soundproofing against the noise of footsteps

R&D focused on the environment

More than 70% of Mapei's research budget (around 60 million Euro per year) is invested in the development and formulation of eco-sustainable products

Choose **MAPEI** for your **eco-sustainable projects**

Mapei is a member of the GBC in the following countries:
USA, Canada, Italy, Spain, Germany, the United Arab Emirates, South Africa, Australia and New Zealand

***LEED** **The Leadership in Energy and Environmental Design**

is the most widely known international reference norm for sustainable building in the world. The LEED standards indicate the requirements for constructing eco-compatible buildings.

The classification of sustainable buildings is by means of a rating system.
The total of the credits obtained enable the final performance of a building to be evaluated for a LEED platinum, gold, silver or certified award.

GREEN INNOVATION

Mapei is a member of the Green Building Council, an association which promotes the LEED certification system

www.mapei.com

MAPEI

ADHESIVES • SEALANTS • CHEMICAL PRODUCTS FOR BUILDING

Photo 1. View of the continuos floor on the ground level made with ULTRATOP and treated with MAPEFLOOR FINISH 52 W.
Photo 2. The floor substrate at lower level was renovated using TOPCEM PRONTO. The natural stone border around the floor was laid with KERAQUICK and ULTRACOLOR PLUS.

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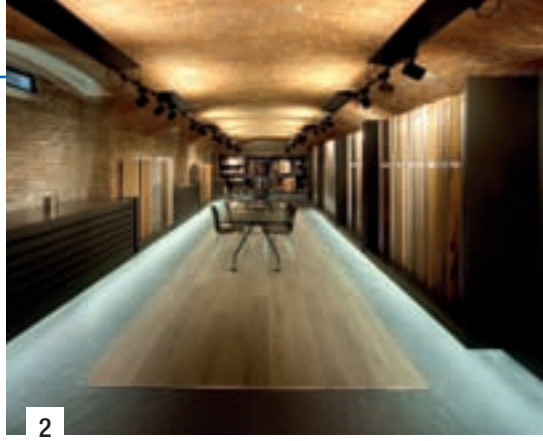

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Area Pavimenti: a new showroom in Milan

Laying a continuous floor in an elegant sales point

Area Pavimenti, a specialist flooring company from Udine (Italy), owns a large showroom in Via Bligny in Milan. The showroom comprises a ground floor and a lower floor, where the company's wide choice of products, which range from wooden floors to resilients and textiles, are on display.
In 2008 Mapei Technical Service Department was contacted by the building company to ask for its collaboration and to supply suitable Mapei products for the restoration work to be carried out to the building.
A survey was carried out on site, and Mapei technicians discovered that there was an old terrazzo floor laid with mortar at ground floor level. It had probably been laid around 50 years ago, and since then, the surface had been levelled with a cementitious product probably during previous restoration work.
During the same intervention, a number of cable and pipe runs had been created to house the new services, and there were a number of voids underneath the terrazzo flooring which gave off a "hollow" sound when tested. Also, because of the high density of conduits in the floor, the width of the runs was not always sufficient to distribute them in the terrazzo flooring correctly.
This is why the Mapei Technical Service Department reported that, once the voids had been filled in, the thickness of the layer above the pipe-work and conduits would not have been sufficient to guarantee the stability of the substrate. As a result, cracking could later occur in correspondence with the pipe and cable runs and also at the construction joints between the old floor and the mortar used to fill the runs.

Starting Point: the Screed

Because of the overall situation, and the client's intention to lay a continuous resin or cementitious floor at ground floor level, the technicians recommended completely demolishing the old floor and installing a new, solid, compact, floating screed to create a stable, durable substrate thick enough for the new flooring. For this new screed, which had to be at least 4-5 cm thick, the technicians chose TOPCEM PRONTO ready-to-use, normal-setting, controlled-shrinkage mortar for quick-drying (4 days) screeds, classified as CT-C30-F6 $A1_{fl}$ according to EN 13813.
The minimum guaranteed thickness of screed above the pipework was around 2.5 cm, and to further reinforce these areas and limit the formation of cracks, the technicians recommended bridging 2 mm diameter metallic reinforcement mesh over the pipe-work.

Installing a Continuous Floor

Once the TOPCEM PRONTO screed had been dried and cured, a continuous flooring layer was applied using ULTRATOP self-levelling mortar with a "natural" finish, particularly suitable for floors with high resistance to abrasion.
After visiting the Mapei showroom in Milan and receiving a number of samples of flooring solutions with various finishes from the Mapei range of products for cementitious and resin floors, the client opted for the ULTRATOP SYSTEM.
The laying surface was initially primed with PRIMER SN two-component epoxy primer with fillers. Immediately after applying the primer, the surface was sprinkled with a layer of QUARTZ 1.2 to guarantee a perfect bond with the ULTRATOP layer.
The next step was to apply ULTRATOP self-levelling mortar in its anthracite shade. ULTRATOP is used to form floors with particularly high resistance to abrasion. When is applied pure, this product is suitable for industrial floors, while if it is polished, it is particularly suitable for showrooms, offices and apartments.
The client also wanted the colour of the floor to remain the same over the years, so Mapei technicians recommended protecting the surface with a layer of MAPEFLOOR FINISH 52 W two-component, polyurethane finishing product in water dispersion with low yellowing properties, which has no effect on the colour of surfaces treated with the product. To add further protection and repel dust, they also recommended a further treatment cycle of MAPELUX OPACA double-reticulating, high-strength matte metallic wax, which also helps to make cleaning and maintenance operations easier for treated finishing layers applied on floors made using ULTRATOP. The wax was applied in two criss-cross coats to provide the entire surface with a good protective layer.

The Lower Level

When the survey was carried out by the Mapei Technical Service Department, at the lower floor


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level they found an old concrete substrate around 6 cm thick installed directly on the ground.
The client wanted to install a natural stone border around the edge of the floor and leave the area inside the border for laying a floating wooden floor installed on an insulating mat to form a vapour-proof barrier, which could then be substituted as and when required.
Before doing so, it was necessary to repair the substrate and lay the natural stone slabs around the perimeter of the area covered with parquet.
The thickness of the substrate had to be increased by building up (by around 2-3 cm) using, again, TOPCEM PRONTO mortar. In order for the TOPCEM PRONTO to form a perfect bond, Mapei technicians recommended applying the mortar on a layer of EPORIP two-component epoxy adhesive using the fresh-on-fresh technique.
To lay the natural stone slabs, KERAQUICK high-performance, quick-setting cementitious adhesive was used. The joints were then

Photo 3. Screeds were built with TOPCEM PRONTO.
Photos 4 and 5. The substrate on the ground level was treated with PRIMER SN and sprinkled with QUARTZ 1.2.
Photo 6. Applying ULTRATOP mortar.
Photo 7. MAPEFLOOR FINISH 52 W provided the ULTRATOP floor with a dust-repellent and anti-oil treatment. MAPELUX OPACA wax was also applied as a protective layer.

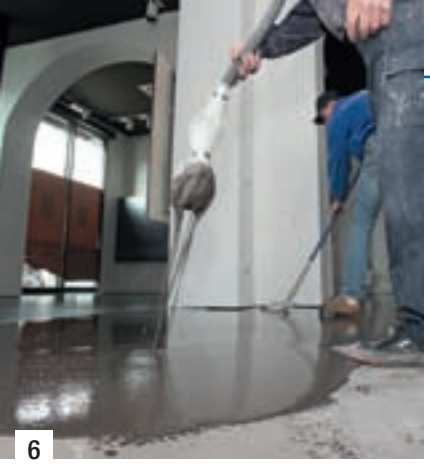
IN THE SPOTLIGHT

ULTRATOP

It is an ultra-quick setting self-levelling mortar based on special hydraulic binders, for abrasion-resistant floor coverings at a thickness from 5 to 40 mm. It may remain on view as a finished floor surface, and is used inside industrial and civil buildings to form abrasion-resistant floors. Used neat, ULTRATOP is particularly recommended for floors in industrial warehouses, stock-rooms subject to traffic with rubber wheels, car-parks, shopping centres and shops. If polished, it is ideal for use inside civil buildings, such as showrooms, offices, shops, restaurants and flats.
If mixed with DYNASTONE COLOR aggregates or with natural aggregates, ULTRATOP may be used to create floors similar to “terrazzo alla Veneziana”. The abrasion-resistance of ULTRATOP, which is considerably high, may be further improved by applying a finishing treatment on the surface using MAPEFLOOR FINISH 50 or MAPEFLOOR FINISH 52 W. It is classified as **CT-C40-F10 A9-A2$_{fl}$-s1** according to **EN 13813**.

MAPEFLOOR FINISH 52 W

It is a solvent-free, two-component, low-yellowing polyurethane finishing product in water dispersion, specially formulated to form a transparent, semi-opaque, wear-resistant protective finishing coat on epoxy products, such as MAPEFLOOR I 300 SL and MAPEFLOOR I 500 W.
It can be used as a transparent finishing coat on resin floors, such as MAPEFLOOR SYSTEM 53 and MAPEFLOOR SYSTEM 33; as a dust-repellent treatment for new and old industrial concrete floors; as a transparent protective layer for concrete structures subject to light chemical attack.
This product is particularly suitable as a finishing coat on cementitious systems such as ULTRATOP, and as a dust-repellent and anti-oil treatment for concrete and natural-finish concrete floors, without leaving the surface with a “wet-look” finish. It complies with **EN 1504-2** standard.



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grouted with ULTRACOLOR PLUS high-performance, anti-efflorescence, quick-setting and drying polymer-modified mortar for joints from 2 to 20 mm wide. It also has BioBlock® technology to prevent the formation of mould in humid environments and DropEffect® technology which makes it water-repellent. This product is available in 26 different colours.

The expansion joints were sealed with MAPESIL LM silicone sealant.

TECHNICAL DATA

Area Pavimenti Showroom, Milan (Italy)
Year of the Intervention: 2008
Intervention by Mapei: supplying products for building screeds, treating substrates and laying a continuos resin floor and natural stone slabs
Client: Area Pavimenti SpA (Udine, Italy)
Works Director: Roberto Salvatore Donno
Contractor: Arco di Roberto Salvatore Donno, Milan
Laying Company: Cortez Srl for the resin flooring; Arco di Donno for the natural stone floorings
Laid Materials: resin floors; natural stone floors
Mapei Distributor: Area Pavimenti SpA
Mapei Co-ordinator: Antonio Salomone, Mapei SpA (Italy)

MAPEI PRODUCTS

The products mentioned in the article belong to the "Products for Ceramic Tiles and Stone Materials" and "Building Speciality Line" ranges. The technical data sheets are available at the web site: www.mapei.com. Mapei's adhesives for ceramics and stone materials conform to EN 12004 and have been awarded the CE mark in compliance with Annex ZA, standard EN 12004. Mapei grouts for ceramics and stone materials conform to EN 13888. Mapei products for the protection and repair of concrete surfaces and structures have been awarded the CE mark in compliance with EN 1504 standards. Mapei levelling and smoothing compounds and pre-blended mortars for screeds conform to EN 13813 standard and have been awarded the CE mark in compliance with Annex ZA, standard EN 13813. Almost all the Mapei products for laying floors and walls are also GEV-certified and have been awarded the EMICODE EC1 ("very low emission level of volatile organic compounds") mark, by GEV. Mapei sealants comply with standard ISO 11600. More than 150 Mapei products contribute points to obtain LEED (Leadership in Energy and Environmental Design) certification.

Preparing the substrates

Eporip (CE EN 1504-4): two-component epoxy adhesive for monolithic sealing of cracks in screeds.
Primer SN: two-component epoxy primer with fillers.
Quarzt 1.2: calibrated silica sand to improve the bond on resin or epoxy primers.
Topcem Pronto: (CE EN 13813, CT-C30-F6 $A1_{fl}$, EC1 R Plus): ready-to-use, normal-setting, controlled-shrinkage mortar for quick-drying (4 days) screeds.

Laying industrial floors

Mapefloor Finish 52 W (CE EN 1504-2): two-component, polyurethane finishing product in water dispersion with low yellowing properties, for anti-dust and anti-oil treatments.
Mapelux Opaca: double-reticulating, high-strength matte metallic wax.
Ultratop (CE EN 13813, CT-C40-F10 A9 $A2_{fl}$-s1, EC1): self-levelling, ultra-quick hardening mortar with special hydraulic binders, applied at a thickness between 5 and 40 mm to create abrasion-resistant floors.

Laying natural stone floors

Keraquick (CE EN 12004, C2FT S1; EC1): high-performance, quick-setting, deformable cementitious adhesive with no vertical slip and extended open time for ceramic tiles and stone material stable in the presence of humidity.
Mapesil LM (ISO 11600, F-25-LM): pure neutral silicone sealant for stone for movements up to 25%.
Ultracolor Plus (CG2, EC1): high-performance, anti-efflorescence, quick-setting and drying polymer-modified mortar with water-repellent DropEffect® and anti-mould BioBlock® technology for grouting joints from 2 to 20 mm wide.

Architectural stone floors

Betontechnik supplies innovative products for laying stones

by Marcello Deganutti and Nancy Onorato, Mapei Betontechnik

From an aesthetical point of view, architectural stone floors selected for use on roads, in town squares and for pedestrian areas in historical town centres are the most attractive choice. Porphyry cubes, slabs and stones are traditionally laid in place on beds of sand or sand and cement and continuously move out of place. This problem is the result of a number of factors: the mechanical stresses induced by the passage of cars and heavy-goods vehicles, de-icing salts which break up the surface of the joints, poor workmanship when laying the stones and freeze-thaw cycles which freeze the water which has penetrated into the paved surface, due to the porous nature of the surface and the action of the de-icing salts. The frozen water increases in volume and breaks up the paved surface. Lowering of the level in the joints and the laying bed breaking up are a consequence of these phenomena, while movement of the stones is the result: a "mobile" cube of porphyry is dangerous for cars, pedestrians and cyclists.

Maintenance on architectural stone floors laid on sand/cement beds must be carried out every six months to guarantee stability and safety, but this means road works which block or interfere with the flow of traffic and high costs for the local community.

Why Choose XF4 Class Concrete?

XF4 class concrete, produced and distributed by Mapei Betontechnik, is a technologically innovative product at a competitive price, and offers a number of advantages.

- The service life of floorings is guaranteed by the product's resistance to freeze-thaw cycles and de-icing salts and its extremely high compressive strength.
- Working times are much shorter: maintenance operations may be completed ahead of schedule, while still guaranteeing the durability of the work.
- The product conforms to UNI EN 206-1 standards, which expressly requires the use of an XF4 class concrete for architectural stone floors, in that it guarantees the durability of the surface.
- A visual check highlights the homogeneity of the work: the colour of the joints is the same for the entire stretch of paved floor on the site, in that the concrete is pre-blended and only needs to be mixed with water.
- It has the capacity of absorbing the mechanical stresses induced by the passage of traffic, including heavy-goods vehicles.
- It is resistant to freeze-thaw cycles and the aggressive action of de-icing salts, thanks to the special admixtures contained in the product.

Mapei Betontechnik is an Austrian company specialised in the production of admixtures for concrete. The Company, which this year celebrates 10 years of activity, was acquired by the Mapei Group in 2009 (see *Realtà Mapei International* n. 30). It offers its clients DURIMENT TFB and PFS/2, which represent the ideal solution for long-lasting results. DURIMENT TFB is a pre-blended, ready-to-use, XF4 exposure class concrete compound in powder form with a 4 mm granulometric range, made from special binders, aggregates and admixtures developed specifically for this kind of application. It is particularly suitable for screeds and for laying architectural stone floors, including those open to traffic. DURIMENT PFS/2 is a grouting mortar with the same characteristics as DURIMENT TFB (Rck 37/XF4), but with a 2 mm granulometric range, and is used for grouting stone floors. The combined use of these two products for architectural stone floors form a durable, monolithic structure which hardly deteriorates over the years.

From top to bottom:
- Gemona del Friuli (Italy), Piazza del Duomo.
- Florence (Italy), metropolitan light railway.
- Vicenza (Italy), Contrà Fogazzaro.
- Grado (Italy), sea-front walk.

1

Re-building the square

Correct techniques and cutting-edge products used to renovate Piazza Garibaldi in Cantù

The City Council of Cantù (in the Province of Como, Northern Italy) needed to upgrade the part of Piazza Garibaldi in the ancient part of the city which is open to traffic by re-positioning the Adamello stone slabs on an area covering a total of 1,600 m².

The road surface had already been repaired in 2006, but problems arising from the instability of the stone slabs meant that the Council had to spend thousands of Euros in maintenance work and bring out two claims for damages.

The City Council and the Prococi engineering studio, asked Mapei to supply a system of products which could solve the problems in the square. And this represented another opportunity for Mapei to show its know-how and technology for the restoration and rearrangement of the ancient part of the city of Cantù. Once again, the growth of the Group made all the difference thanks to the acquisition of Betotechnik in 2009, together with its know-how in the field of admixtures for concrete. Thanks to the technical assistance of Marcello Deganutti – who is currently Head of the technical-commercial department of Mapei's Architectural Flooring Division - DURIMENT TFB 3.2 screed was recommend for the installation of stone while DURIMENT PFS/2 was recommended to grout the joints. Both pre-blended, XF4 class products represent technologically advanced, cutting-edge concrete products which are the only ones in their field to guarantee mechanical strength of more than 40 N/mm² after 28 days, much higher than conventional materials, excellent resistance to freeze-thaw cycles and the aggressive action of de-icing salts and a reduction in down times before opening to traffic. Mapei Betontechnik supplied a part of the products for the first phase of the work (250 m²), which was started on the 25th of August 2010 by the contractor Antica Via from Pontoglio (Brescia, Italy) and completed in the first week of September, well ahead of the schedule established by the client. The work carried out were monitored until March 2011, and since the results were satisfactory, the Cantù City Council decided to complete the remaining 1,350 m². The use of XF4 class concrete has already proven to be advantageous: rapid application with a reduction in work times and overall costs, high performance levels which have made the architectural flooring much more stable and more resistant to constant stress, compliance with UNI EN 206-1 to guarantee the durability of the work and, as a result, a reduction in maintenance work.

The Lady Mayor of Cantù, Tiziana Sala, with obvious satisfaction after the first phase, promoted two press conferences, one at the beginning of the work and then a second one when work was completed ahead of schedule, and committed the Council to promoting a convention about architectural stone flooring, conducted by Mapei Betontechnik with technicians from the local City Council.

Photo 1. A view of the square after completion of the ristoration works.
Photo 2. The Adamello granite slabs were removed and cleaned.
Photo 3. The slabs were laid in place on a "bed" of DURIMENT TFB 3.2 supplied by Mapei Betontechnik.
Photo 4. The joints were grouted with DURIMENT PFS/2.

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Aix-La-Chapelle Cathedral

Mapei products and technologies played a major role in restoring the most ancient cathedral in Northen Europe

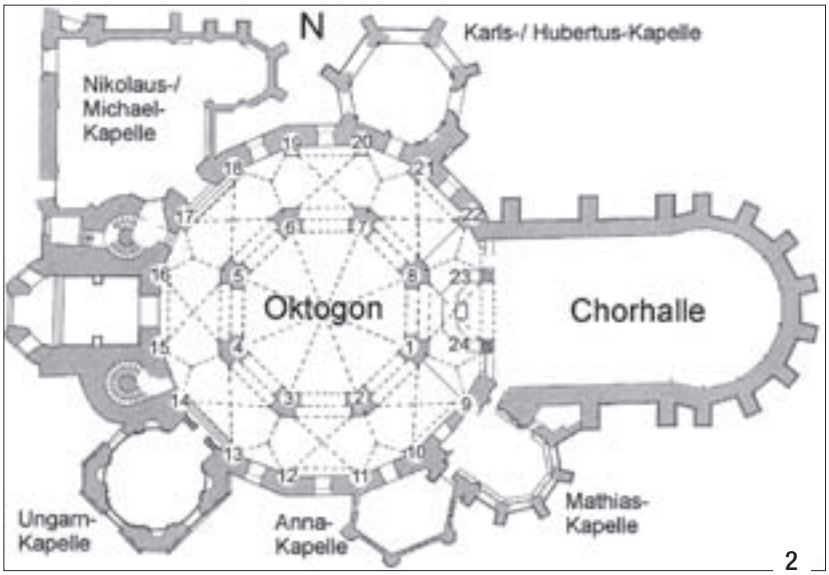
As a beneficence of Charlemagne, the Church of Our Lady (also called Marienkirche in German) was erected around 800 in the city of Aix-La-Chapelle (Aachen in German). In this church the emperor was entombed on January 28th, 814, the day he died. In succession of Charles, from 936 to 1531, the German-Roman kings were crowned in the Aix-La-Chapelle Minster. From the 14th century on, the Church of Our Lady became one of the most famous places of pilgrimage to the north of the Alps. In the sanctuary tour which is celebrated every 7 years, the dress of Maria, the so called "Jesus' nappies", the decapitation cloth of John the Baptist and Jesus Christ's waistcloth were shown. The increasing number of pilgrims, visiting the church was the reason for the extension in Gothic style of the Minster, starting from 1355. So the choir hall, a ring of 5 chapel extensions and a Gothic tower in the west section were built in the course of about 100 years.

The Church was severely damaged by the serious fire in Aix-La-Chapelle in 1856; the roofs and the tower including bells were destroyed.

The economic situation of the convent and the city of Aix-la-Chapelle only permitted a restoration in simple structures. In the 18th century, a late phase of baroquification started with the rise of Aix-La-Chapelle to a famous bath town. In the French period - in 1794 Aix-La-Chapelle was occupied by French troupes and belonged to France from 1801 to 1815 - the Minster was elevated to the Episcopal Cathedral of the first Aix-La-Chapelle diocese.

The restoration of the Aix-La-Chapelle Minster in the 19th century involved large-scale structural alterations. The Gothic elements were extensively renovated; a neo-Gothic West tower was erected in 1884 on the Carolingian West building. The neo-Byzantine interior decoration of the old Carolingian building is the impressive conclusion of this period.

Photo 1. View of Aix-La-Chapelle Cathedral.



Picture 2.
Ground view of the Cathedral with marking of the pillars of the octagon (no. 1 to 8) and of the pillars of the sixteen-angle (no. 9 to 24) which were involved in the restoration works.

Photo 3.
The middle building in the cathedral complex (called "octagon") with its neo-Byzantine mosaics.

Thanks to its unique historical and art-historical importance in the European context, the Aix-La-Chapelle Cathedral was the first German building which entered the UNESCO world heritage list in 1978. Today the Aix-La-Chapelle Cathedral is a living Lord's House as Episcopal Church of the diocese, re-established in 1930, where several Masses are celebrated every day. The sanctuary tours attract all 7 years a great number of pilgrims and continue the old tradition of pilgrimage. Thanks to its invaluable importance for the European mediaeval history of culture and art the Aix-La-Chapelle Cathedral draws every year about one million of international guests, who can visit the central building and the treasure chamber and, in the course of guided tours, also the choir hall and the High Minster.

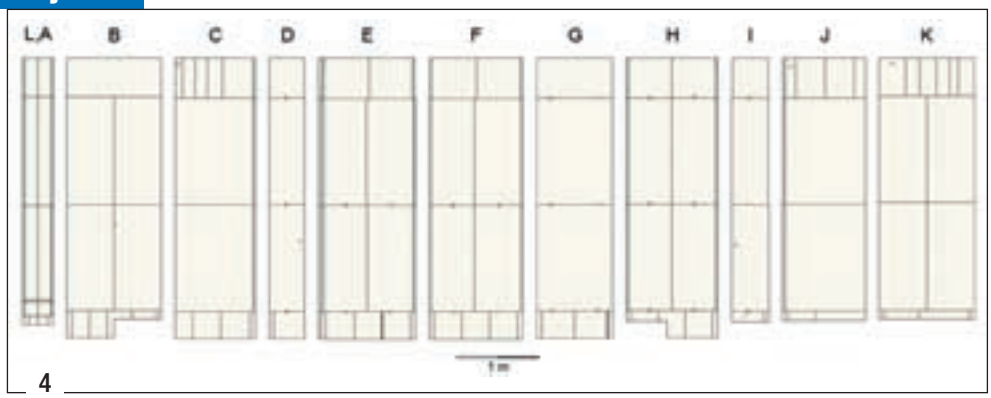
The Building Design

The ground plan and building design of the Aix-La-Chapelle Cathedral are evidence of the Church's changing importance and use. The Carolingian building, an octagon, arched by a cupola, is in sound condition for the most part. The octagon is surrounded by a two-storey, sixteen-angled gallery and is furnished with a tremendous foyer front. The mediaeval throne, which can be dated back to the Carolingian period, as the latest analysis show, is positioned in the Western span of the high Minster. The Gothic choir building joins in the East. This building, unique from the static point of view, is dominated by the about 26 m high window panels. 5 chapel buildings, designed with non-uniform outlines and on the majority carried out as two-storey units in the Gothic period, abut upon the exterior walls of the sixteen-angle. The central mosaic of the cupola with the *Majestas Domini* and the 24 Eldest decorative patterns was designed in 1880-1881 according to the plans of Jean Bethune. The further mosaic and marble decoration of the octagon traces back to the design of Hermann Schaper and Friedrich Schwarting in the late 19th century.

Restoration Works

The history of the restoration of the Aix-La-Chapelle Cathedral started in the middle of the 19th century with the re-erection of the pillars of the High Minster which were demolished in the French period; followed by the recreation of the decorations and the glazing of the windows of the choir hall, accompanied by the overal ligthening of the Cathedral. Having survived the 2nd World War relatively undamaged, the local damages occurred in the building were repaired and single parts of the structure worked over object-oriented.

In the course of an extensive documentation of the damages in the early 80s, an enormous need for reconstruction was stated. At the end of 2005 reconstruction work started: the interior reconstruction of the cathedral included the restoration and conservation of the mosaic and marble décor of the central building, as well as the repair of natural stone coverings on the octagon pillars, which began in 2007 and was completed in 2010.



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The Restoration of the Natural Stone Slabs

The natural stone coverings of the inner walls of the pillars of the octagon and of the sixteen-angle, which were installed only 120 years ago, showed clearly visible damages. The natural stone slabs which were applied here are made of a natural stone variety called "cipollino", classified as an ophicalcite from petrographical point of view. The type applied here comes from Saillon in Switzerland. The repair of the damages was absolutely necessary, in order to be able to counteract the destruction of this cultural-historical building structure. In 2006, the expert office Rock and Mineral Consulting, Albrecht Germann & Ralf Kownatzki GbR, which is based in Herzogenrath (Germany), was entrusted with the examination of the damaged natural stone covering of the pillars of the octagon and sixteen-angle by the Cathedral master builder Helmut Maintz from Cathedral chapter Aix-La-Chapelle. The first aim of this examination was to find the reason for the deterioration of the wall slabs. It could be demonstrated, that a considerable part of the chemically caused damages to be seen on the surface of the wall slabs, must be traced back to natural alteration processes. They are the result of the attack by carbonic acid, which is a product of the reaction of carbon dioxide with water.

The measurements of selected gases in the compartment air of the octagon in the Aix-La-Chapelle Cathedral could verify that a serious part of the gas carbon dioxide comes from the exhaled air of the visitors. On peak days, especially in the pre-Christmas period, 15,000 visitors per day are registered. The water which is necessary for the formation of the carbonic acid is provided from the air humidity, which condenses on the surfaces of the stones on colder days.

In a further step of the analysis, the damages of the octagon and the sixteen-angle in the ground floor were documented and assessed in detail. 1,200 wall slabs with a total area of 385 m² were examined. The scope of the damages, caused by weathering, ranged from losses due to polish to bigger breakaways. Moreover, cracks in the stone were of particular interest, which were separately examined and assessed because of their enormous frequency. Basing on these findings, measures for a purposeful restoration of the wall slabs were discussed and worked out in close collaboration with Helmut Maintz.

With regard to the restoration

Picture 4. Execution of the pillar n. 1 in the octagon.
Photo 5. Removal of the natural stone slabs from the pillars.
Photo 6. Cleaning of the back sides of the slabs from mortar residues.
Photo 7. Storage of the stainless steel sheets and the prepared natural stone slabs for acclimatisation in the octagon.
Photo 8. Mounting the stainless steel sheets on the pillars.
Photo 9. Determination of the deformation behaviour of the sandwich elements in the climate chamber.

IN THE SPOTLIGHT

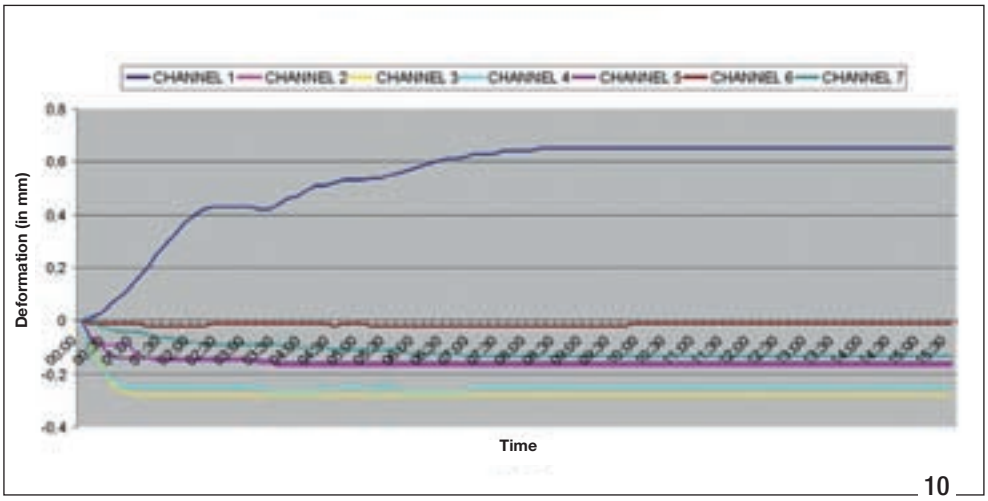
KERALASTIC T

It is an improved **(2)** reaction resin adhesive **(R)** and slip resistant **(T)** as class **R2T** according to **EN 12004.** It is ideal for indoor and outdoor, wall and floor bonding of ceramic tiles, stone material and mosaics of all types on screeds, renders, concrete, asphalt, wood, metal, PVC, reinforced polyester, asbestos-cement, gypsum board, gypsum panels, etc. KERALASTIC is a two-component solvent and water-free thixotropic adhesive which is flexible and waterproof.

It is made up of a polyurethane base (Part A) and a special hardener (Part B). When mixing the two parts together, the result is a paste with easy workability; excellent durability and resistance to ageing; perfect adhesion on all surfaces used in building; high deformability. It is highly thixotropic: it can be applied vertically without slump and without letting even heavy or large tiles slip.

It can contribute up to **2 points** for the **LEED** certification.

of the seriously damaged wall slabs with stone cracks, the expert office Rock and Mineral Consulting consulted further experts. Walter Mauer, Head of the Technical Service Department of Mapei GmbH, the German subsidiary of the Mapei Group, took care about the applications engineering and Prof. Dr. Stein of the Technical College Trier about the building physics advice. For this project Mapei proposed a safe and proven repair system.



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Picture 10. Deformation behaviour of the sandwich elements at a temperature change of 20°C (from +20°C to +40°C).
Photo 11. Removal of the exceeding quartz sand.
Photo 12. Application of EPORIP and MAPETEX on the back side of the natural stone slabs as anti-crack protection.
Photo 13. Priming of the stainless steel sheets with PRIMER MF.
Photo 14. Application of KERALASTIC for bonding the natural store slabs.

Problems and Solutions

The adhesion of some of these large-sized wall slabs (max. 132x56x2 cm) was no longer sufficient. The slabs, installed on mortar lumps, were fixed with copper wire fastenings. Here, restoration measures were taken in order to eliminate the hazard for the visitors in the long term. So, the large-sized natural stone slabs concerned had to be fixed to the load-bearing masonry in a way that could ensure long-lasting stability without substantial modifications of the surface or in the masonry cross section of the brick work dating back to the 8th century.

Mapei's proposal for the restoration works comprised several working steps and products.
First of all, the natural stone slabs which were installed with the spot bonding method and fixed with copper wire hooks were dismounted. In case of destruction of a slab, the individual parts had to be inserted in a dimensionally accurate frame immediately after disassembly and repaired with EPORIP TURBO fast-hardening two-component polyester resin. In order to prevent damages during transportation, some slabs were provided with a protective treatment by bonding MAPETEX non-woven fabric on their backs with EPORIP adhesive.
The specialists of the Cathedral construction department then carried out the treatment of the slabs.
2 mm thick stainless steel sheets, congruent with the respective natural stone slabs, were fixed on the masonry, with 6 screws each. Prior to the installation, PRIMER MF solvent-free two-component epoxy primer was applied on the back sides of the stainless steel sheets. The surfaces were then sanded with fire dried quartz sand of grain size 0.7-1.2 mm. The measurements which were carried out didn't provide any indication of moisture potential, affecting the back sides, which could be attributed to capillary rise processes.
KERALASTIC T high performance two-component polyurethane adhesive with no vertical slip, was applied on the stainless steel sheets and the reverse side of the natural stone slabs.
This product was also applied in 5 mm layers at the borders of the slabs and over the mounting screws in different thicknesses (with tolerances ranging from 2 to 15 mm), which depended on the horizontal and vertical irregularities. The large-sized natural stone slab were bonded with KERALASTIC T and protected from slipping for 24 hours by fixing with wedges or spacers.


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Checking the Restoration Concept as for Suitability in Practice

The restoration concept had been previously checked regarding its suitability in practice, considering the object-specific parameter. For this purpose, "Jura yellow" natural stone slabs in original size were mounted on pillar exhibits which were prepared in full size


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Photo 15. Stainless steel sheets mounted as supporting layer.
Photo 16. Application of KERALASTIC T on the stainless steel sheets.
Photo 17. Mounting of the natural stone slabs.

in the demonstration area of the Mapei GmbH Technical Service Department. The practicability of mounting the natural stone slabs from the scaffold, as well as the accurate adjustment of the slabs considering their thickness tolerances and the still considerable tolerances in the evenness of the support, were tested at the exhibits. KERALASTIC T proved to be the optimal choice thanks to its slip resistance and the possibility of applying it in layer thicknesses from 5 to 15 mm. Front sides and side surfaces could be mounted perpendicularly and horizontally, despite the partially considerable tolerances in evenness.

After complete reaction of the adhesive, adhesive strengths of >1,5 N/mm^2 were measured, which guarantee the permanent adhesion of the natural stone slabs to the stainless steel sheet.

The different temperature extension behaviour of the materials (natural stone, stainless steel, epoxy resin and polyurethane resin) which were applied in the "sandwich-like" system, required the examination of the elements in the climate chamber, considering the climate conditions in the cathedral. For this purpose, the sandwich elements were stored in the climate chamber at a relative humidity of 50% and exposed to 24-hours-climate cycles of 40°C-10°C-40°C.

The tests were carried out in order to determine the elongation and deformation of the sandwich elements and the possible alterations of the adhesion between the different materials. The result of the measurements was a maximum deformation of 3.5 mm. This means, that a temperature difference of +/-5°C must be achieved, prior to the start of the works. Basing on the average deformation rate (3.5 mm), the real elongation results to be of 0.55 mm, which can surely be relieved with the 1 mm wider joints between the sandwich elements. A reduction of the adhesion spectrum, resulting from the different temperature extension behaviour, can be excluded in case of professional mounting. The result of the practice tests carried out in the Mapei GmbH Technical Service demo area and the tests in the climate chamber showed that the Mapei solution, developed by the experts, could be realised in the practice and perform well.

Visitors to the Cathedral can now enjoy the sight of properly restored pillars with natural stone coverings brought back to their original beauty.

This article was taken from Realtá Mapei n. 7/2009, the in-house magazine published in German language by the German, Austrian and Swiss subsidiaries of the Mapei Group, whom we would like to thank.

TECHNICAL DATA

Aix-La-Chapelle Cathedral, Aix-La Chapelle (Germany)
Period of Construction: late 8th century

Period of the Intervention: 2007-2010
Intervention of Mapei: supplying products for restoring and laying natural stone slabs on several pillars in the octagon and in the sixteen-angle
Client: Diocese Aix-La-Chapelle
Project: Helmut Maintz, Aix-La-Chapelle Cathedral Building Management
Works Direction: Helmut Maintz
Contractor: Aix-La-Chapelle Cathedral Building Management
Laying Company: Steinmetz- und Steinbildhauerei Christoph Schwarzenberg (Aix-La-Chapelle)
Geo-scientific Analysis: Rock and Mineral Consulting Dr. Albrecht Germann & Dr. Ralf Kownatzki GbR (Herzogenrath,Germany)
Laid Materials: natural stone slabs (ophicalcite)
Mapei Distributor: Schmidt Rudersdorf, Würselen (Germany)
Mapei Co-ordinator: Walter Mauer, Mapei GmbH (Germany)

MAPEI PRODUCTS

The products mentioned in the article belong to the "Products for Ceramic Tiles and Stone Materials" and "Building Speciality Line" ranges. The technical data sheets are available at the web site: www.mapei.com. Mapei's adhesives for ceramics and stone materials conform to EN 12004 and have been awarded the CE mark in compliance with Annex ZA, standard EN 12004. Mapei grouts for ceramics and stone materials conform to EN 13888. Almost all the Mapei products for laying floors and walls are also GEV-certified and have been awarded the EMICODE EC1 ("very low emission level of volatile organic compounds") mark by GEV. Mapei products for the protection and repair of concrete surfaces and structures have been awarded the CE mark in compliance with EN 1504. More than 150 Mapei products can contribute points to obtain the LEED certification.

Eporip (CE EN 1504-4): two-component epoxy adhesive for monolithic sealing of cracks in screeds.
Eporip Turbo: fast-hardening two-component polyester resin for sealing cracks in screeds.
Keralastic T (CE EN 12004, R2T): high performance two-component polyurethane adhesive with no vertical slip for ceramic tiles and stone material.
Mapetex: special non-woven fabric that can be used as a substrate for the installation of floor and wall coverings that can be easily removed.
Primer MF: solvent-free two-component epoxy primer to be used as an adhesion promoter of Mapefloor line products and to consolidate and waterproof, from residual damp, cementitious substrates. Also used to impregnate surfaces of unsound concrete floors.

Keralastic/Keralastic T

Nave da crociera Ruby Princess - Italia

Application

Keralastic, two-component, high performance, polyurethane adhesive for ceramic tiles and stone material, also available in thixotropic version

- Easy workability
- Perfect adhesion on all surfaces used in building
- Hardens by chemical reaction without shrinkage until it becomes highly resistant
- High deformability
- If applied in a continuous layer, it ensures perfect waterproofing before installing tiles with the same product
- **Keralastic T** features high thixotropy: it can be applied vertically without slump and without letting even heavy or large tiles slip. Its performavces and slipping strength are in compliance with EN 12004 and EN 1308.

Keralastic + Keralastic T are CE approved, as marked in ITT certificates n° 25040320/Gi (TUM) and n° 25040471/Gi (TUM) respectively, issued by the Technische Universität München laboratory (Germany).

www.mapei.com

MAPEI®

ADHESIVES · SEALANTS · CHEMICAL PRODUCTS FOR BUILDING

Union Square shopping centre

A complete system of ceramic flooring solutions from Mapei provided a stylish finish to a prestigious shopping centre in Scotland

Aberdeen is located in the North East of Scotland and is its third most populated city. It's literal meaning "between the Don and the Dee" refers to Aberdeen's two bordering rivers, the River Don and River Dee, where settlers first established dwellings 8000 years ago. Since the discovery of North Sea oil in the 1970s, Aberdeen's traditional trades of fishing, paper-making, shipbuilding and textiles have been overtaken by the oil industry and Aberdeen's seaport. Consequently the city was named the "oil capital of Europe".

Before the oil boom, Aberdeen was previous dubbed the "granite city", "grey city" and "silver city" due to the grey granite locally quarried during the mid-18th to mid-20th centuries. It is this granite, renowned for its mica deposits that sparkle like silver, which is incorporated into Aberdeen's indigenous city buildings. This local granite was applied to the wall and floor coverings at the award winning Union Square shopping centre.

Opened in 2009, the centre contains a covered two-level shopping mall and retail park. It is one of the UK's largest city centre shopping developments and the second largest in Scotland. It holds 65,000 m^2 of retail space and offers its visitors a multi storey car park with 1,700 spaces, more than 60 shops, twelve restaurants, a ten screen 2,300 seat cinema and a 3-star hotel with 203 rooms.

The complex also has a strategic position: it adjoins onto the side of Aberdeen railway station and new bus station creating a transport hub.

Preparing the Screeds

The concrete substrate was first prepared with a system of Mapei's rapid drying screed: TOPCEM. When the centre was designed by the architects in charge of the project, a different screed was originally specified. However A. De Cecco Ltd., the tiling contractors of the project, were familiar with Mapei solutions due to previous works and were instrumental in changing the specification.

They required the use of TOPCEM special normal-setting, quick-drying, controlled-shrinkage hydraulic binder. The choice was due to the centre owners' committed and rigid deadline. TOPCEM's quick drying times and compressive strength proved to be a vital aspect to completing the project on schedule. Indeed, this product allows light foot traffic in approximately 12 hours and is ideal for flooring where rapid drying is required for short installation times.

Another advantage was created by installing a complete system of Mapei products: all products required for the installation of stone coverings were supplied by the same manufacturer.

In total TOPCEM was installed in a 70 mm thickness in an area of approximately 7,000 m^2.

Nearing completion TOPCEM was replaced with MAPECEM for a 350

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Photo 1. Before laying the porcelain tiles, the screeds were built up using TOPCEM.
Photos 2 and 3. All variations of porcelain tiles and granite slabs laid with KERAQUICK in its grey shade.
Photo 4. View of the Union Square shopping centre inside areas.

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m^2 area, again installed at a 70 mm thickness. Specified for its high mechanical, abrasion strength and fast installation times, the application of MAPECEM allowed the final small area to have the tiles laid within only 3-4 hours of it being laid. Once the screeds had cured, the installation of the porcelain tiles and granite slabs could proceed.

Laying Porcelain Tiles on the Floors...

Within the two levels of the shopping centre approximately 8,000 m^2 of ceramic tiles and granite slabs were installed on the floors with 1,000 m^2 of porcelain tiles installed on the walls. To the ground floor a mixture of porcelain tiles and granite slabs were laid with the first floor solely comprising of porcelain tiles.

On the ground and first floor of the main malls, mixes of anti-slip porcelain tiles were specified. A combination of three different colours and three different sizes of porcelain tiles were installed on a total area of 6,310 m^2.

A mixture of 600x400x10 mm, 600x200x10 mm and 600x100x10 mm tiles in beige, grey and cream were utilised. Brown and grey 600x600x10 mm border tiles were also installed around the perimeter.

The pattern of the porcelain tiles was so random it meant every size and colour of the tiles within the mall had to be counted to ensure that the order was correct.

In addition to this, 900x150 mm timber effect tiles were installed in the middle of the mall and 600x600x10mm mirage porcelain tiles were installed on the walls in the shop fronts.

Continuing the Mapei product system, KERAQUICK was the chosen adhesive in a grey shade. This quick-setting adhesive was an ideal choice as it is has excellent bonding properties and is suitable for all kinds of ceramic, porcelain, glass, mosaic and natural stone tiles.

KERAQUICK is particularly suitable for areas subject to heavy traffics and when surfaces need to be in service rapidly, such as in this project.

Photo 5.
Timber effect tiles were installed in the middle of the mall with KERAQUICK in its grey shade.

IN THE SPOTLIGHT

TOPCEM

It is a special hydraulic binder which, when mixed with graded aggregates and water, can produce mortars that can harden in approximately 24 hours, and dry in approximately 4 days.

It is used for the formation of bonded, unbonded and floating screeds on both existing and new concrete prior to the installation of wood, PVC, linoleum, ceramic tiles, natural stone, carpet or any other flooring where rapid drying is required for short installation times. It is suitable for indoor and outdoor use.

It can contribute up to **2 points** for the **LEED** certification.

Photo 6. In the ground floor atrium porcelain tiles and granite slabs were laid with KERAQUICK. Tile joints were grouted with ULTRACOLOR PLUS; expansion joints were sealed with MAPESIL AC.

... and Granite Slabs in the Atrium

Granite slabs were installed on a total area of 1,690 m^2 using KERAQUICK adhesive within the north and south ground floor atrium. The granite slabs specified were a mixture of six different colours and six different sizes. The slabs were 30 mm thick but varied in size from 800x800 mm to 750x150 mm to complete the striking and aesthetically pleasing floor design. The granite slabs were intersected by 10 mm thick porcelain tiles. The 20 mm difference in thickness with the granite slabs (with a 30 mm thickness) caused a minor difficulty for the floor layers. To ensure the finished surface was completely level, a 20 mm layer of TOPCEM was built beneath the porcelain tiles.

This factor made it vitally important that at the design stage of the installation the screed was poured at two different levels as the north and south atrium areas had to be lower than the rest of the mall to compensate for the thickness of the granite.

Another difficult element of the project was the onsite cutting of holes for pillars and lights. Problems also arose and were overcome when fitting the access hatches and manhole covers. These had to be fitted and thereafter covered with the granite. For the walls in the centre, the layers installed 600x600x10 mm block porcelain tiles to the rendered walls, again using KERAQUICK.

Perfect Grouting and Sealing

The system of Mapei products was completed using ULTRACOLOR PLUS mortar to grout the joints. ULTRACOLOR PLUS uses BioBlock® technology which blocks the formation at the root of the micro-organisms which causes mould. This makes tile joints easier to maintain -s vital for public areas such as this was. The colouring is also resistant to UV rays and atmospheric agents allowing the chosen finish to last longer.

MAPESIL AC silicone sealant (both in colours 113 – cement grey - and 114 - antracite) was used to seal expansion joints in all the laid coverings and to complement the ULTRACOLOR PLUS grout colors that had been used. A combination of a system of quality, Mapei products, professional installation and project management ensured that the venture was not only completed on schedule but also to the high standard that the prestigious new build required.

TECHNICAL DATA

Union Square Shopping Centre, Aberdeen, Scotland (UK)
Year of Construction: 2008

Period of the Intervention: 2008-2009
Intervention by Mapei: supplying products for laying porcelain tiles and granite slabs
Project: BDP, Glasgow (UK)
Client: Hammersmith Ltd., London (UK)
Contractor: Miller Construction, Edinburgh (UK)
Laying Company: A. De Cecco Ltd., Glasgow
Laid Materials: porcelain tiles and granite slabs (supplied by Todagres, Ariostea, Mirage)
Mapei Distributor: CDT, Glasgow
Mapei Co-ordinator: Gordon Ferguson, Mapei UK

MAPEI PRODUCTS

The products mentioned in the article belong to the "Products for Ceramic Tiles and Stone Materials" and "Building Specialty Line" ranges. The technical data sheets are available at the web site: www.mapei.com. Mapei's adhesives for ceramics and stone materials conform to EN 12004 and have been awarded the CE mark in compliance with Annex ZA, standard EN 12004. Mapei grouts for ceramics and stone materials conform to EN 13888. Mapei products for the protection and repair of concrete surfaces and structures have been awarded the CE mark in compliance with EN 1504 standards. Mapei levelling and smoothing compounds and pre-blended mortars for screeds conform to EN 13813 standard and have been awarded the CE mark in compliance with Annex ZA, standard EN 13813. Almost all the Mapei products for laying floors and walls are also GEV-certified and have been awarded the EMICODE EC1 ("very low emission level of volatile organic compounds") mark by GEV. Mapei sealants comply with standard ISO 11600.
More than 150 Mapei products can contribute points to obtain the LEED certification.

Preparing the substrates

Mapecem: special quick-setting and drying (24 hours), controlled-shrinkage hydraulic binder for screeds.
Topcem: special normal-setting, quick-drying (4 days), controlled-shrinkage hydraulic binder for screeds.

Laying ceramic tiles and stone material

Keraquick (CE EN 12004, C2FT S1; EC1): high-performance, quick-setting, deformable cementitious adhesive with no vertical slip and extended open time for ceramic tiles and stone material stable in the presence of humidity.
Mapesil AC (F-25-LM): pure, anti-mould, acetic silicone sealant for movements up to 25%.
Ultracolor Plus (CG2, EC1): high-performance, anti-efflorescence, quick-setting and drying polymer-modified mortar with water-repellent DropEffect® and anti-mould BioBlock® technology for grouting joints from 2 to 20 mm wide.

Gran Melia Daios Cove

Natural stone and porcelain tiles for a luxurious resort in Creta

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Agios Nikolaos is a Greek city located on the eastern coast of the island of Crete and well known as a tourist hub. Beside beautiful beaches and top-level hotels, the city is home of an archaeological museum whose collection contains finds from the Neolithic era, Minoan remains, and Greco-Roman finds.

The Genoans built here the castle of Mirabello which takes its name after the wonderful view it has over the whole bay and the city itself.

In an outstandingly picturesque eastern cove of the rural landscape surrounding Agios Nikolaos is set the hotel complex Gran Melia Cove, which belongs to the Gran Melia luxury hotel chain. The land where the hotel is situated slopes down to the beach and the buildings are designed so as to be harmoniously integrated with the landscape in general.

Photo 1. View of the Gran Melia Daios Cove hotel.

Photos 2 and 3. KERAFLEX MAXI S1 cementitious adhesive was used to bond natural stone coverings on the walls and on the floors in the external areas.

Photo 4. Tile joints in the public areas floors were grouted with KERACOLOR FF.

Photo 5. Clinker tiles were laid in the swimming pools with KERAFLEX adhesive. The substrates had been previously waterproofed with MAPELASTIC SMART.

Therefore natural colors are prevailing in the complex and the majority of the vertical surfaces are covered with natural stone; moreover, one can find plenty of green oasis in every level.

The complex covers an area of 220.000 m^2, out of which 32.000 m^2 are building facilities.

The hotel lobby is located at the highest point. All the façades are covered with glass, in order to offer the visitors the magnificent view of the place and make them feel absolutely comfortable and free.

The rest of the public-use areas are amphitheatrically constructed in five levels down the reception, with a large number of terraces and green roofs, which end up in the big central swimming pool of the complex, exactly one level over the sea. The 300 rooms of the central unit are also amphitheatrically constructed on either sides of the basic axle, which is shaped by the public-use areas. Some of the rooms have their own individual pools, while the suites of the hotel are located in the south side of the cove and in parallel arrangement to the beach, for those visitors who desire a more isolated and peaceful stay.

Congress centre, thalassotherapy amenities, two restaurants and all the electro-mechanical facilities that support the hotel's activities are included in the complex.

Mapei's products were used in all the construction phases of the project. After removing the damaged and loose concrete from the surfaces which needed repair after


2

the demoulding, MAPEGROUT THIXOTROPIC fibre-reinforced, controlled-shrinkage mortar was applied.
MAPELASTIC SMART, two-component, high-flexibility cementitious mortar, embedded with glass-fibre mesh MAPENET 150, was used for waterproofing the substrates in the swimming pools, the bathrooms and the balconies.
The majority of the vertical surfaces in the public areas were covered with uneven natural stones, which were installed with the high-performance deformable cementitious adhesive KERAFLEX MAXI S1 (classified as C2TE S1 according to EN 12004). KERAFLEX MAXI S1 was also used for bonding the marble slabs on the floors, especially in the public-use areas.
In the corridors that lead to the rooms, the substrates were treated with PRIMER G synthetic resin primer in water dispersion, before applying ULTRATOP self-levelling, ultra-quick hardening mortar chosen in its light grey color shade.
Clinker tiles were installed in the swimming pools, using the high-performance cementitious adhesive KERAFLEX (classified as C2TE according to EN 12004) in its wide shade and KERACOLOR FF polymer-modified cementitious mortar (classified as CG2 according to EN 13888), mixed with FUGOLASTIC polymer liquid admixture instead of water.
The rooms floors were levelled with ULTRAPLAN ECO self-levelling,


3


4


5

IN THE SPOTLIGHT

ULTRALITE S1

It is a cementitious **(C)**, improved **(2)**, slip-resistant **(T)**, extended open time **(E)**, deformable **(S1)** adhesive, classified as **C2TE S1** according to **EN 12004** standard.
It is used for bonding all types and sizes of ceramic tiles (double-fired, single-fired, porcelain, klinker, terracotta, etc.) on uneven internal and external substrates; for bonding natural stones on internal and external surfaces (for stone which is stable and not sensitive to humidity); for bonding thin porcelain tiles on floors and walls, including external façades.
The innovative Low Dust technology which characterises this adhesive considerably reduces the amount of dust given off when mixing the product compared with standard Mapei cementitious adhesives.
It features low density, which results in easier handling and savings in transport costs.
ULTRALITE S1 mix has a high yield and a low viscosity, which makes it easier and quicker to apply. Its thixotropic nature means there is no vertical slip when fixing on walls, even with large-sized tiles.
ULTRALITE S1 has been awarded **CE** mark, as indicated in ITT certificate N° 25080237/Gi issued by the Technische Universität München laboratory (Germany).
It can contribute up to **6 points** to **LEED** certification.

6

Photo 6.
On the floors in the guests' rooms porcelain tiles were laid with KERAFLEX adhesive in its white shade or ULTRALITE S1 according to the tiles size.

ultra quick-hardening smoothing compound, after the application of PRIMER G. Porcelain tiles were installed with KERAFLEX in its white shade or ULTRALITE S1 one-component, high-performance, deformable cementitious adhesive (classified as C2TE S1 according to EN 12004), depending on the tiles size.
All the joints were grouted with KERACOLOR FF used in a wide range of colors.
Visitors can now relax in the complex and enjoy Gran Melia Daios Cove's amenities, also thanks to Mapei products which ensure comfort and safety.

TECHNICAL DATA

Gran Melia Daios Cove, Agios Nikolaos, Crete (Greece)
Period of Construction: 2007-2010

Period of the Intervention: 2007-2010
Intervention by Mapei: supplying products for concrete repair, treating and waterproofing substrates, laying natural stone and ceramic tiles wall and floor coverings
Client: Gran Melia Hotels & Resorts, Agios Nikolaos
Project: 3SK Stylianidis Architects, Athens (Greece)
Works Direction: 3SK Stylianidis Architects, Athens
Contractor: Gamma Sigma Construction A.T.E - Kounenakis Bros, Athens
Laying Company: Gamma Sigma Construction A.T.E - Kounenakis Bros
Laid Materials: natural stones, clinker tiles, porcelain tiles
Mapei Distributor: Kafousis Heraklion, Crete
Mapei Co-ordinators: John Koropoulis, Mapei Hellas SA (Greece)

MAPEI PRODUCTS

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Repairing concrete

Mapegrout Thixotropic (CE EN 1504-3, R4): fibre-reinforced, controlled-shrinkage mortar for repairing concrete.

Preparation of the substrates

Mapelastic Smart (CE EN 1504-2, coating **(C)** principles **PI**, **MC** and **IR**, **EN 14891):** two-component, high-flexibility cementitious mortar applied by brush or with a roller, for waterproofing concrete surfaces such as balconies, terraces, bathrooms and swimming pools and for protecting against aggressive agents.
Mapenet 150: alkali-resistant glass fibre mesh (in compliance with the ETAG 004 guide) for reinforcing protective waterproofing layers, anti-fracture membranes and thermal insulation systems.
Primer G (EC1): synthetic resin primer in water dispersion with a very low content of volatile organic compounds (VOC).
Ultraplan ECO (CE EN 13813, C25-F7 $A2_{fl}$-s1, EC1): self-levelling, ultra quick-hardening smoothing compound for thicknesses from 1 to 10 mm, with a very low emission level of volatile organic compounds (VOC).
Ultratop (CE EN 13813, CT-C40-F10 A9-$A2_{fl}$-s1, EC1): self-levelling, ultra-quick hardening mortar with special hydraulic binders, applied at a thickness between 5 and 40 mm to create abrasion-resistant floors.

Laying ceramic tiles and natural stone materials

Fugolastic: polymer liquid admix for Keracolor FF, Keracolor GG and Keracolor SF.
Keracolor FF (CG2, EC1 R): pre-blended, high-performance, polymer-modified cementitious mortar with water-repellent DropEffect® technology for grouting joints up to 6 mm wide.
Keraflex (CE EN 12004, C2TE, EC1 R): high-performance cementitious adhesive with no vertical slip and extended open time for ceramic and stone tiles.
Ultralite S1 (CE EN 12004, C2TE S1): one-component, high-performance, deformable cementitious adhesive with no vertical slip, long open time, Low Dust technology and extremely high yield easy to apply by trowel, for ceramic tiles and stone material.

Ultralite S1

Contains more than 30% recycled material

GREEN INNOVATION BY MAPEI

MAXI YIELD +60% COMPARED WITH STANDARD MAPEI CEMENTITIOUS ADHESIVES

Application

One component, lightweight cementitious adhesive with Low Dust Technology.

The special Technology used to manufacture **Ultralite S1** gives it a low density, a characteristic which offers two main advantages:

- **Higher yield: yield is approximately 60% higher compared with standard Mapei cementitious adhesives**
- **Lower weight (15 kg) compared with common cementitious adhesives (25 kg)**

furthermore:

- 90% less dust during mixing, application and usage compared with standard Mapei cementitious adhesives
- Excellent capacity of accommodating deformation in the substrate
- Perfect bonding to all materials normally used in the building industry

Ultralite Technology™

Low Dust

EN 12004 C2TE S1 MAPEI

CE EN 12004

www.mapei.com

MAPEI®

ADHESIVES • SEALANTS • CHEMICAL PRODUCTS FOR BUILDING

Mapetherm: Mapei thermal insulation composite system

Comfort, energy saving and many other advantages

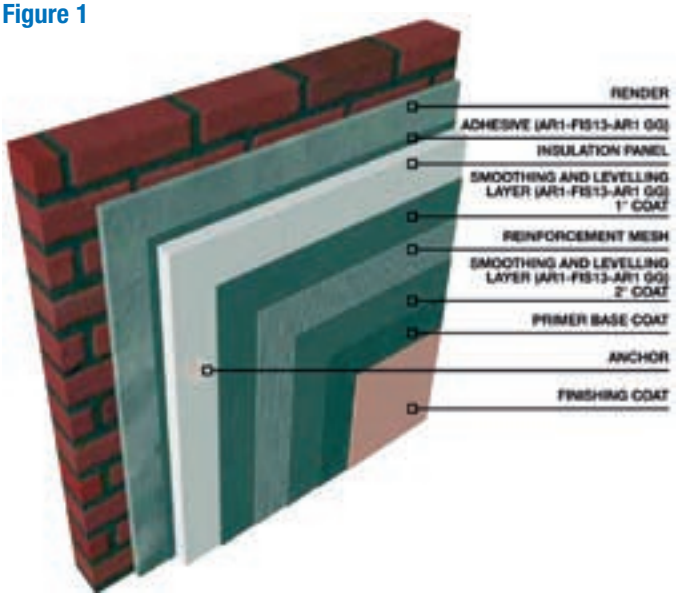
by Amilcare Collina* and Gian Piero Pignola**

The energy performance of a building, which has been considered not significant in the past, is becoming more and more important because of the environmental constraints and the increasing cost of the fuel. The external thermal insulation composite system is the only viable solution for the energetic upgrading of the existing buildings. However, the advantages of the installation of MAPETHERM, Mapei's thermal insulation system, are not limited to the energy saving as indicated hereunder.

Mapetherm Description

MAPETHERM is a system including an adhesive, a levelling mortar, an insulation panel, an alkali-resistant reinforcement grid, a primer and a finishing coat, as well as sealants and accessory materials for the installation[1]. (Figure 1).

Figure 1



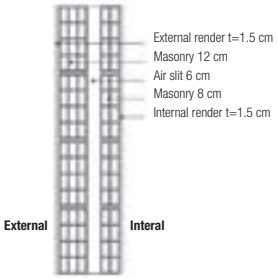
Being MAPETHERM a multi-component system, the compatibility among the components is a key factor in order to obtain the performances of the overall system as well as its durability.

Reference Wall Stratigraphy

The reference wall considered in the present work is reported in Figure 2.

The heat losses for the reference wall were determined considering the interior of a room maintained at 20°C and external temperature

Figure 2



of -5 °C in winter season.

The thermal flow is 28 W/m^2 without using a thermal insulation system. It is reduced up to 8 W/m^2 when applying MAPETHERM (in the presence of a 80 mm thick insulating panel).

The evaluation has been performed also for the summer season according to the same methodology, considering the interior of a room maintained at +22 °C, external temperature of +30 °C and a wall temperature of +50 °C, which is higher than external temperature due to sun radiation.

The temperature profiles for both cases are reported in figures 3a (wintertime) and 3b (summertime).

The temperature profiles clearly show that the MAPETHERM system allows the thermal gradients to be reduced inside the wall leafs.

The reduced thermal gradient, proportional to the heat flux, highlights the beneficial effect of the MAPETHERM on the energy saving both in wintertime and summertime.

This reduction also leads to

Figure 3a

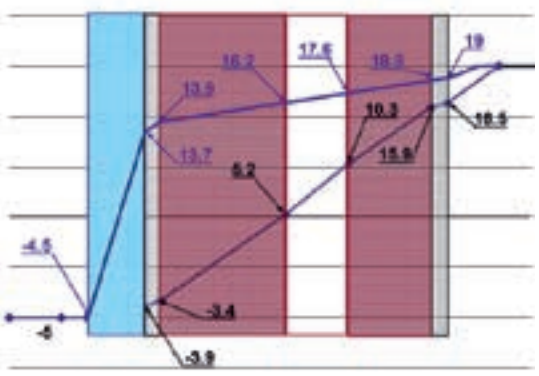


Figure 1. MAPETHERM system stratigraphy.

Figure 2. Reference wall stratigraphy.

Figures 3a and 3b. Temperature profiles of the walls in wintertime (3a) and summertime (3b): the blue line refers to walls with MAPETHERM, the black line refers to walls without MAPETHERM.

mechanical benefits in terms of structural stresses in the masonry as explained below.

Stress within the Masonry

Any temperature difference in the masonries causes internal stresses[2]. The stress is mainly due to the restrained thermal inflection, which causes most of the relevant mechanical stress.

The thermal expansion coefficient is λ_m and is assumed equal to 8 μm/m°C, a typical value for the brick masonries. The thermal inflection, $\mu = \lambda_m (\Delta T/t_m)$ - being t_m the wall thickness - is due to the thermal gradient, ΔT, inside the wall given by the different temperature on the external - T_e - and internal - T_i - surface of each wall. On safe side, it is assumed that the thermal deformation is fully restrained by the surrounding structure so that the bending moment - and the corresponding maximum stresses σ_m - can be evaluated according to equation (1) assuming an elastic linear behavior for the material.

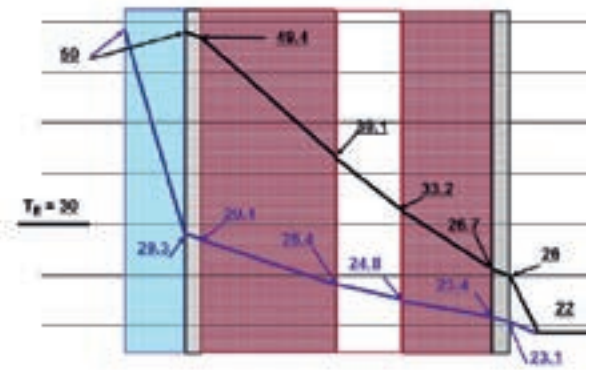
$$\sigma_M = \pm \mu E_m t_m / 2 \quad (1)$$

In tables 1a and 1b are reported the maximum stresses inside the external and internal walls, respectively. Tensile stresses are positive. The stresses are higher in the external wall.

It can be seen that without the MAPETHERM the stresses are relevant and can cause mechanical damages or even failures in tension.

The presence of the MAPETHERM is able to reduce the tensile stresses of about 75% both in winter and summertime, leading to high safety margins for the structure.

Figure 3b



Tables 1a and 1b. The tables show the maximum stress σ_M of external (1a) and internal wall (1b) with ΔT thermal gradient.

	Summer		Winter	
	with MAPETHERM	w/out MAPETHERM	with MAPETHERM	w/out MAPETHERM
ΔT	-2.7 °C	-10.3 °C	2.3 °C	8.6 °C
σ_M	54 kPa	206 kPa	46 kPa	172 kPa

Table 1a

	Summer		Winter	
	with MAPETHERM	w/out MAPETHERM	with MAPETHERM	w/out MAPETHERM
ΔT	-1.4 °C	-6.5 °C	1.2 °C	6.2 °C
σ_M	28 kPa	130 kPa	24 kPa	124 kPa

Table 1b

Peeling Stress within the Adhesive

The installation of the MAPETHERM system reduces the temperature gradients in the masonry, because

the main temperature gradient lies inside the insulating panel (see Figure 3). This is the main reason for the stresses in the adhesives used to bond the panels to the masonry. The typical stresses induced by the wind, for instance, are much lower than the stresses induced in the adhesives by the thermal effects.

The adhesive is modeled as in the Winkler model as a series of independent normal springs smeared over the masonry with stiffness $k_a=E_a/t_a$, where E_a and t_a are the Young Modulus and the thickness of the adhesive, respectively. Each insulating panel can be modeled separately due to the typical application mode: E_p and t_p are the Young Modulus and the thickness of the panel, respectively, and w is the panel's vertical displacement in relation to the masonry.

The equation governing the system is given by:

$$\left(\frac{E_p t_p^3}{12}\right)\frac{\partial^4 w}{\partial x^4}+k_a w=0 \quad (2)$$

The integral of the differential equation is:

$$w=e^{-\alpha x}\left[A\cos(\alpha x)+B\sin(\alpha x)\right]+e^{\alpha x}\left[C\cos(\alpha x)+D\sin(\alpha x)\right] \quad (3)$$

where four constants (A, B, C, D) have to be determined and the parameter α - related to the characteristic length of the phenomenon 2π/α - is:

$$\alpha=\sqrt[4]{\frac{3k_a}{E_p t_p^3}} \quad (4)$$

The boundary conditions are:

1. on the axis of symmetry (x=0) the rotation (δw/δx) and the shear force (proportional to $\delta^3 w/\delta x^3$) are zero due to symmetry.
2. at the end of the panel (x=L), where L is half length of the panel, the bending moment M (proportional to the elastic curvature $\delta^2 w/\delta x^2$) and the shear force are zero (condition at the free edge).

The four boundary conditions lead to the definition of the four constants A, B, C, D.

The peeling stresses in the adhesive are evaluated as $k_a w$. The relevant geometrical and mechanical characteristics of the materials are reported in table 2.

The thermal gradient in the panel is the difference of temperature (related to the panel thickness) on the external and internal surface, assumed equal to -28°C and +20°C in summer and winter season, respectively (see figure 3).

Figure 5 shows the normal stress variation in the adhesive as a function of the distance from the center of the panel in winter season, as well as the transverse displacements of the panel. The stress concentration is at the free edge and the maximum tensile stress is found equal to 195 kPa, correspondingly the maximum transverse displacement of the panel is about 0.7 μm.

Figure 6 shows the equivalent in summer season of Figure 5. The stress concentration is at the free edge, but is in compression, while the maximum tensile stress is found equal to 63 kPa.

The comparison between summer and winter season seems to bring to the conclusions:

1. in the summer season, the peeling stress in the adhesive is generally lower than in winter season, appearing the winter season

Figure 4

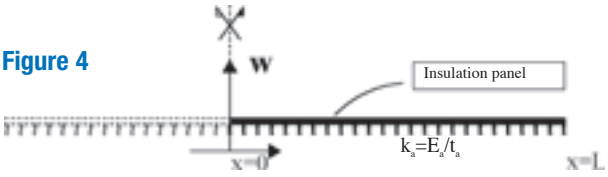


Table 2

	Panel	Adhesive
Young Modulus	12 MPa	1200 MPa
Thickness	80 mm	4 mm
Thermal expansion λ_p	70 μm/m °C	n.a.
Half Length	625 mm	n.a.

Figure 5

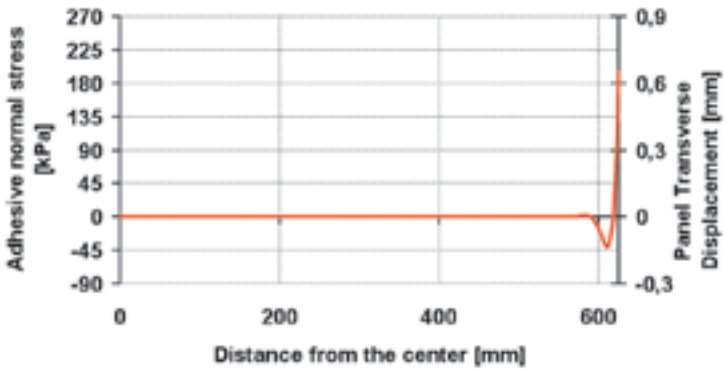


Figure 6

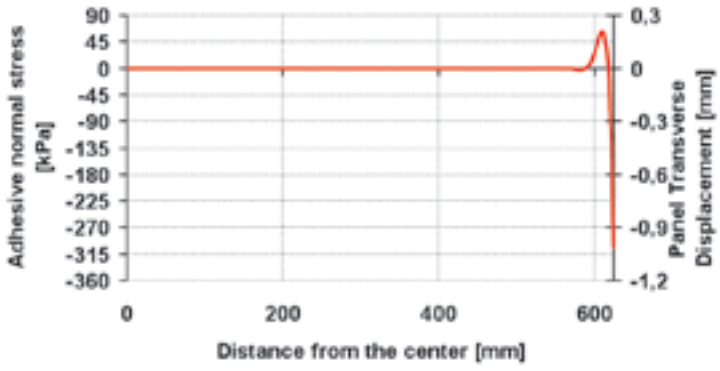


Table 2. Geometrical and mechanical characteristics of the system.

Figure 4. Sketch of half of the insulation panel.

Figure 5. Adhesive normal stresses and panel transverse displacement in winter season.

Figure 6. Adhesive normal stresses and panel transverse displacement in summer season.

more critical;
2. the characteristic length of the phenomenon is in this case about 60 mm, and consequently the only solicited portion of the adhesive is close to the edges of the panel;
3. the other (inner) portion of the panel is almost unloaded;
4. a reduced application of the adhesive only along the perimeter of the panel seems safe.
These conclusions are misleading because in summer season the compression in the panel, due to the linear thermal expansion, is restrained thus leading to compression stability issues. The stability is crucial if the adhesive is applied only at the free edges of the panel. In this case the compression stress in the panel is higher than the critical stress (according to Euler theory[2]), as described in the following paragraph.

Euler Stability

The Young modulus of the panel is very low and the slenderness is very high, so that the critical stress, σ_{cr}, may be rather low. It may be comparable or lower than the stress σ_N induced by the restrained linear thermal expansion. Only expansion (in summer season) is crucial, while contraction (in wintertime), inducing tension, is stable.
The compressed panel can be assimilated to a simply supported beam 4L long, with L being the panel's half-length. The critical stress according to Euler's theory is:

$$\sigma_{cr} = \frac{\pi^2 E_p t_p^2}{(4L)^2 \times 12} \quad (5)$$

Table 3 reports the outcomes of these analyses, being the safety factor the ratio σ_{cr}/σ_N.
The values show that the panel deflects until it breaks.
The critical stress is also highly related to the planarity of the panel and is reduced due to application defects. The application of the adhesive in a continuous layer and the care of planarity of the panel are the only ways to overcome these drawbacks. The presence of the adhesive in a continuous layer yields to significantly higher values of the critical stresses [3].

Shear Stress within the Adhesive

The linear thermal deformation of the panel also leads to shear stresses in the adhesive, close to the free edges. The evaluation of the maximum shear stress, τ_{max}, can be performed based on the shear lag theory[4] considering the axial load due to the restrained thermal deformation. The shear modulus of the adhesive, G_a, is assumed equal to 300 MPa.

$$\tau_{max} = \frac{\sigma_N}{\sqrt{\frac{t_a}{G_a}\frac{E_p}{t_p}}} \quad (6)$$

Assuming again a $(T-T_r)=\pm 30°C$, the maximum shear stresses in both summer and winter seasons are reported in table 4 for 80 mm and 40 mm panels. Shear stresses are generally high so that a high quality adhesive specifically developed for this application must be used in order to guarantee the performance of the system.

Table 3

	80 mm Panel
Thermal stress σ_N	25 kPa
Critical stress σ_{cr}	10 kPa
Safety Factor	0.4

Table 3. Euler stability check.

Conclusions

From the above-mentioned analysis we can come to the following conclusions:
a) the MAPETHERM system guarantees more than comfort and energy saving. It reduces the stresses in the rear masonry walls of about 75%, leading to high safety margins for the structure.
b) the main temperature gradient lies inside the insulating panel. This is the main reason for the stresses in the adhesives used to bond the panels to the masonry.
c) the peeling stress in the adhesive is due to the restrained thermal inflection caused by the temperature gradient within the panel thickness.
d) a model is proposed to evaluate these stresses: the main outcomes are that the most solicited portions of the adhesive are close to the panel edges, the maximum tensile stresses are relatively high and can be held only by high quality adhesives.
e) even though the peeling stress in summer season seems to be lower than in winter, the situation is more critical in summertime. The restrained expansion of the panel yield to compression stress relevant if compared to the low critical (Euler) stress due to the high slenderness of the panels. The stability is more and more crucial for lower thicknesses of the panel. The application of the adhesive in a continuous layer and the care of planarity of the panel are the only ways to overcome these stability issues. The results of the analyses, carried out in this paper, clearly show the added value of the MAPETHERM system. The advantages, not limited to the energy saving, make the investment related to the MAPETHERM system installation attractive from the eco-sustainable and financial point of view. The critical issues strongly suggest the application of the whole system should be designed and realized by a reliable supplier.

The article is available at www.mapei.it in the "Approfondimenti tecnici" section.

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[3] Augenti, N. *Lezioni di stabilità delle strutture.* (Lectures on Structural Stability) Ilardo. Napoli, Italy. 1992. *In Italian*

**Prof Amilcare Collina is responsible for public relations between Mapei and the scientific community in Italy and at an international level.
**Prof. Gian Piero Lignola teaches at Federico II University of Naples, Department of Structural Engineering

MapeWrap System

Application phase

System for static and anti-seismic strengthening and upgrading of load-bearing structures.

Recommended for reinforced concrete, masonry, tuff and steel structures

- Simple, quick application
- Highly durable
- No problem of corrosion of the strengthening applied
- No increase of the masses involved: interventions carried out using MAPEWRAP SYSTEM do not increase the mass
- Completely reversible application
- System certified as a “Type A application”, in compliance with CNR-DT 200/2004

1

2

Pile gate bridge

Renovation of an ancient bridge in Croatia

Photos 1 and 2. View of the Pile Gate bridge.

"Non bene pro toto libertas venditur auro" (Freedom is not to be sold for all the treasures in the world): this sentence was in ancient times engraved above the gate of Lovrijenac, the unconquerable fort of the capital of Croatia. Dubrovnik is a city of unique political and cultural history and world famous monument heritage, which is inscribed in UNESCO World Heritage list. In the course of its turbulent history, Dubrovnik, thanks to political astuteness, managed to gain self-government and for centuries acted as a neutral, independent state: the Dubrovnik Republic lasted from 1358 to 1808 and the City Statute dates back to 1272.

Pile Gate is the entrance gate to Dubrovnik from the west. During the Dubrovnik Republic, Pile Gate had an important geo-strategic position, and the ancient fortress of Lovrijenac was built on the cliff below Pile as the only fort outside the city walls surrounding Dubrovnik. The word "Pile" ("pilea" in Greek) means gate, so the very name of the western Dubrovnik suburb speaks how the Pile Gate has been for centuries the main entrance to the city. On Pile there is a stone bridge within two Gothic arches, the work of the famous Paskoje Miličević dated 1471. It includes the outer and inner gates and two bridges. Numerous sculptors and builders were engaged in their construction, among them Ivano from Siena (who around 1397 built the first part of the stone bridge) and the local builder Paskoje Miličević (who was active in the second part of the 15th century). The bridge also features a wooden drawbridge which was raised in the past by chains, counterweights and reels to close the city gate, protecting the city from thieves and wild animals. In 19th century, parts of columns, beams and a part of the arch were damaged by fire, while in 20th century a stone fence was added substituting the original iron one.

The Start of Renovation: Analysing the Structures

The customer's main expectation was to restore the bridge in accordance with its original design, both in the selection of materials and in the method of their treatment and installation. One part of the bridge renovation also included reconstruction and structural repair. The bridge foun-

Photo 3. MAPEWRAP C FIOCCO carbon fibre cord was used for anchoring.
Photo 4. The anchor base was made by using EPORIP to bond the cord ends to the bottom of the opening.
Photo 5. Anchoring with MAPEWRAP C FIOCCO carbon fibre cords.
Photos 6 and 7. MAPEWRAP C UNI-AX high strength unidirectional carbon fibre fabric was used to cover the anchored areas.
Photo 8. After applying the MAPEWRAP products, the surfaces were then sprinkled with quartz sand.
Photo 9. The strengthened zone was protected with a traditional lime-based mortar.

dations were standing on hard dolomite limestone with sufficient bearing capacity to transfer any load from the bridge through its core structure.
The bridge's stability and bearing capacity were tested in relation to the state it would have had after the completion of renovation works.
The tests results for compression and tension strains for individual load bearing cases and the bridge stability, despite its geometrical irregularity, were relatively favourable. It was necessary to ensure a good joint performance of the single elements of the structure.
The project designers calculated the spatial structure with loads corresponding to realistic strains on the bridge.
The tests took into account the geometrical irregularities and the results allowed the calculation of proper depth of the joints between individual columns.

The First Phase: Preparing the Substrate
The contractor carried out the bridge's structural strengthening using a complex innovative procedure. The traditional anchorage and strengthening procedures were not acceptable for several reasons: the use of steel ties and slabs would not only have caused the increase of the overall weight but also the concentration of strains and danger of corrosion.
The only non-invasive solution was the use of new technologies from FRP (Fibre Reinforced Polymer) system.
The advantages of this new system are resistance to electrochemical corrosion, high strength-to-weight ratio, product versatility and electromagnetic neutrality. As in any other repair projects, this one was also preceded by careful preparation of the substrate.
Removal of asphalt layers and filling materials and the washing of the substrate from dirt and unbound parts were essential operations for the proper bonding of repair materials in order to ensure structural stability. As the substrate was made of dolomite limestone bonded with a hydraulic binder, before applying FRP materials it was necessary to smooth the surface with a proper repair mortar.
PLANITOP HDM MAXI two-component, high-ductility cementitious mortar with a pozzolanic-reaction binder base was used in the sections needing strengthening and applied in layers of about 20 cm wide and 2 cm thick. After preparing the substrate, CARBOPLATE 170/100 pultruded carbon fibre plates pre-impregnated in epoxy resin, in the length of 17.55 m, were bonded with ADESILEX PG1 two-component thixotropic epoxy adhesive which ensured good bonding of the two materials on different bases.

Second Phase: Carbon Fibre Cords, Rods and Fabrics
The second phase of renovation works included anchoring the carbon fibre plates into the bridge columns. The ends of bars were bonded in boreholes featuring a diameter of 55 mm, and a depth of 4.5 m.

IN THE SPOTLIGHT

PLANITOP HDM MAXI

It is a two-component, fibre reinforced, high-strength-cementitious mortar with fine-grained selected aggregates, special admixes and synthetic polymers dispersed in water. When the two components (component A powder and component B liquid) are mixed together, an easy to spread mix is obtained which may be applied on vertical surfaces at a thickness of up to 25 mm per layer. Thanks to its high content of synthetic resin, PLANITOP HDM MAXI has high bonding strength and, once hardened, forms a tough, compact layer which is impermeable to water and aggressive gases present in the atmosphere, but highly permeable to vapour.
It may be used on its own as a filler mortar or to repair brickwork, stone and tuff ceilings; for strengthening masonry facing walls, ceilings and general masonry work; smoothing over stone, brick and tuff elements before reinforced structural strengthening applications.
PLANITOP HDM MAXI meets the requirements defined by **EN 1504-9** ("Products and systems for the protection and repair of concrete structures - Definitions, requirements, quality control and evaluation of conformity - General principles for the use of products and systems") and the minimum requirements claimed by **EN 1504-3** ("Structural and non structural repair") for structural mortars of class **R2**.


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Photo 10. The strengthened zone was protected with a traditional lime-based mortar.

The boreholes had to be cleaned and made firm before installing anchors.
Mutual cooperation and engineering expertise of the project designer, construction site supervisor and manager worked very well and brought to the choice of an alternative, innovative method: the anchoring was carried out with carbon fibre cords tied into a roll by using a MAPEROD G pultruded rods in fibreglass with a diameter of 10 mm, pre-impregnated with modified epoxy ethyl vinyl.
The carbon fibre plate was anchored to the columns by using "sandwich" elements.
MAPEWRAP C FIOCCO carbon fibre cords were tied into a roll, inserted into an opening. The borehole was then sealed with EPORIP epoxy resin. Carbon fibre cords are made of a number of carbon fibres tied into a cord with a protective net. Their tension strength is about 9 times higher than the tension strength of reinforced steel. The anchor base was made by using EPORIP two-component epoxy adhesive in order to bond the cord ends to the bottom of the opening. The carbon fibre plate was bonded at the top of the anchor by using MAPEWRAP 31 two-component superfluid medium viscosity epoxy adhesive, while MAPEWRAP C UNI-AX unidirectional carbon fibre fabric was applied as the final overlay.
This innovative method proved to be very efficient in other structures as well. The final protection and the perfect bonding with the finishing layer were ensured by applying ADESILEX PG1 on the surface of the plates which were then sprinkled with quartz sand. Finally, the strengthened zone was protected with a traditional lime-based mortar, whose composition was very similar to the mortar originally used for building the structure.
The stone covering was then installed. The structural strengthening operations have completely preserved the Pile Gate bridge's original design and structural elements. Mapei products, together with an excellent team work, strongly contributed to a very fine result.

TECHNICAL DATA

Pile Gate Bridge, Dubrovnik (Croatia)
Year of Construction: 1471

Year of the Intervention: 2008
Intervention by Mapei: supplying products for structural strengtheining
Client: Association of Friends of Dubrovnik Heritage, Dubrovnik
Project: Prof. D.Sc. Blaž Gotovac; Omega Engineering Ltd, Dubrovnik
Contractors: Građevinar Quelin Ltd, Dubrovnik; Spegra Inženjering Ltd, Split (Croatia)
Works Direction: Željko Perković and Miljenko Vučić
Supervision: Ministry of Culture, Conservation Department Dubrovnik; IGH PLC, Marko Kovačević
Mapei Distributor: Spegra Inženjering Ltd, Split
Mapei Co-ordinator: Dejan Šomoši, Mapei Croatia d.o.o

MAPEI PRODUCTS

The products mentioned in this article belong to the "Building Speciality Line" range. The technical data sheets are available at the website: www.mapei.com. Mapei products for the protection and repair of concrete surfaces and structures have been awarded the CE mark in compliance with EN 1504.
More than 150 Mapei products contribute to obtain LEED (Leadership in Energy and Environmental Design) certification.
Adesilex PG1 (CE EN 1504-4): two-component thixotropic epoxy adhesive for structural bonding.
Carboplate E 170/100: pultruded carbon fibre plate pre-impregnated in epoxy resin, protected on both sides by a plastic film.
Eporip (CE EN 1504-4): two-component epoxy adhesive for monolithic sealing.
Maperod G: pultruded rods in fibreglass pre-impregnated with modified epoxy ethyl vinyl, for structural strengthening of damaged elements in reinforced concrete, brickwork, stone and tuff.
MapeWrap C UNI-AX: high strength unidirectional carbon fibre fabric with high modulus of elasticity.
MapeWrap 31: two-component superfluid medium viscosity epoxy adhesive for impregnation with MapeWrap "dry system".
MapeWrap C Fiocco: carbon fibre cord for impregnating with MapeWrap adhesives.
Planitop HDM Maxi (CE EN 1504-3, R2): two-component, high-ductility cementitious mortar with a pozzolanic-reaction binder base, applied at a maximum thickness of 25 mm, for levelling off stone, brick and tuff substrates.

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Assett Banca in San Marino

Top-down waterproofing treatment on a cutting-edge, eco-sustainable building

Located in Gualdicciolo, a suburb, or "curazia" as they are known in this area, of the Castle of Acquaviva in the Republic of San Marino, the local branch of Asset Banca, a banking institute in this small independent state (an enclave in Italy), decided to build rather than rent a building which combines efficiency with respect for the local environment. The site is in an area undergoing major reclamation work, which includes demolition of the old buildings and the construction of the new headquarters for the bank.

The client made it quite clear to the designers that it would like a bank unlike conventional banks, a place where people feel at ease with closer contact between the bank's employees and clients. And the result shows large windows on the ground floor and the entrances to the bank protected by a system of cutting-edge invisible laser beams rather than traditional barriers and reinforced filters. This is a modern building using advanced technology, created with eco-sustainable design criteria integrated into the architecture to obtain class A energy certification: in fact, it is the first A class building in the Republic of San Marino.

The building has 45 geo-thermal probes integrated into the 40 metre deep foundation piles which, through continuous heat exchange with the subsoil, guarantee that there is enough energy available for the heating and conditioning systems without the need for conventional generators. Apart from the solar energy collectors, there are 450 m^2 of photovoltaic panels integrated into the covering on the roof which generate approximately 21,000 kWh/year, enough to supply almost all the electrical energy required for the building.

A 35,000 litre tank guarantees that rainwater is collected and then recycled for the sanitary and toilet services and to freshen up the building naturally during hot periods with a water-evaporation system on the façades.

And lastly, there are 3 micro-turbines which also produce electricity by exploiting energy from the winds. All this leads to a saving every year of 63,000 kWht and a reduction of the CO_2 emissions into the atmosphere by 15,000 kg, 70% less compared with a traditional building. An ambitious, innovative project which, apart from being the headquarters of the bank, will also house a 300-seater auditorium, various administration and management offices on the top floors and an underground parking system.

The particular morphologic layout of the ground and certain logistics problems led the designers responsible for the structural and architectural development of the construction to choose the top-down technique to build the part below ground level.

Photo 1. A detail of a section of the bank, which illustrates the part below ground level where Mapei products have been used. CO_2 emissions and energy savings are also mentioned.

Photos 2 and 3. Waterproofing through the thickness of the floor slabs was carried out by positioning a portion of L-profile MAPEPROOF bentonite sheet between the retention walls and horizontal floor of the excavation, making sure that an one metre wide portion of the MAPEPROOF on the flat part of the excavation was protected with a polyethylene sheet.

Photo 4. MAPEPROOF CD polyethylene washers were used to fasten the sheets in place.

And it was exactly the designers, right from the very start of the project, which contacted the Mapei Technical Service Department for advice about the part below ground level which needed to be waterproofed. For Mapei, thanks to MAPEPROOF, to take part in the design, laying and on-site technical assistance phases of a waterproofing system on a structure built using the top-down technique, was a moment to be particularly proud and enthusiastic about. The wide range of techniques used for each single detail demonstrated the importance of the completeness of the system, as well as the experience of the Mapei Technical Service Department in the top-down technique.

The Top-Down Technique

This technique means that a building is constructed below ground level starting from the upper part and working progressively downwards to the lower part, exactly the opposite of traditional building methods.

A wide range of problems which normally arise when building underground multi-storey car-parks and structures below ground level in general may be solved using this technique, in which all the spaces where the intervention takes place are limited due to traffic problems or the high density of residential units in the vicinity. This solution allows designers, building companies and local authorities to work quickly and efficiently in complete safety.

The top-down technique and conventional building techniques using tie-rods are conceptually the same: in fact, tie-rods carry out the same function as an internal contrasting structure. In practice, however, there are enormous operational differences, and there are three main reasons to choose the top-down technique: the first one regards the way the construction is actually carried out. If the ground has to be excavated to a depth of more than 10 metres, it has to be contained using extremely high performance structural techniques which are much more costly. Also, in built-up areas, it is not always possible to use the tie-rod technique.

The second reason regards safety, in that containment structures for the excavated ground must be promptly supported to reduce their deformation and, in certain cases, damage to buildings in the vicinity of the excavation.

The third and final reason regards logistics: the areas on the surface in correspondence with the construction work, for example roads and town squares, may be used while construction work is still being carried out below ground level.

From Top To Bottom

As far as waterproofing is concerned, the key technical detail is represented, without a doubt, by the continuity of the system in the most critical point of the structure: the attachment between floor slabs and the retention walls. In this specific case, the Mapei Technical Service Department

recommended the use of MAPEPROOF bentonite waterproofing sheets. MAPEPROOF is unique in this field and offers an undeniably speedy and guaranteed intervention thanks to its self-hooking properties prior to casting. In fact, with top-down construction work, excavation work is carried out by a series of partial, stepped excavations carried out at progressively lower levels in correspondence with each floor, and only after casting the corresponding floor slabs.

This operation is possible thanks to an opening in the load-bear-

ing floor slabs – cast and fitted into the retention walls – through which the earth-moving vehicles may go down and dig out the next excavated layer.
Waterproofing through the thickness of the floor slabs, therefore, must be carried out right from the start of construction operations, by positioning a portion of L-profile MAPEPROOF bentonite sheet between the retention walls and horizontal floor of the excavation.
It is important that a one metre wide portion of the MAPEPROOF on the flat part of the excavation is protected with a polyethylene sheet, to ensure that the concrete cast for the floor slabs does not get attached to the bentonite sheet. This operation is necessary because, if we observe the sheet from below during the next excavation operation, it must free itself from the bottom of the floor slab and remain at 180° to the vertical retention wall, so that it may be used to form an overlap when the waterproofing layer is applied vertically. The sheets must be laid starting from the top, making sure that the edges overlap by at least 10 cm, and are fastened in place with washers and MAPEPROOF CD polyethylene washers every 30 cm.
Most detailed work was carried out directly on site, such as waterproofing the heads of the piles which pass through the foundation slabs, the through-pipes for the geo-thermal heating system, the lift wells and the internal storage tanks.
These operations were carried out professionally and successfully fol-

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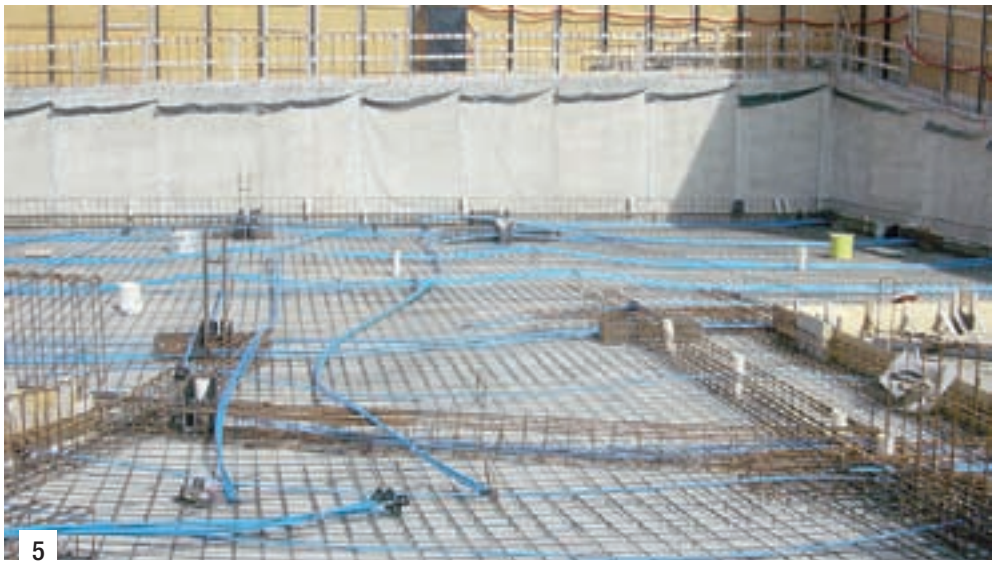
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Photo 5. Reinforcing the floor slabs on the first excavated floor with metallic mesh.
Photo 6. Excavated area under the first floor slabs.
Photo 7. View of the drop overlap of the MAPEPROOF sheet where the retention wall is attached to the floor slabs.
Photo 8. The head of a pile sealed with MAPEPROOF MASTIC and IDROSTOP B25.

IN THE SPOTLIGHT

MAPEPROOF

It is a betonite waterproofing sheet composed of two geofabrics in needle-punched polypropylene, with the upper layer in non-woven fabric and the lower layer in woven fabric, which form a sandwich around a uniform layer of micronised natural sodium bentonite. Thanks to its special mechanical strengthening system, the micronised natural sodium bentonite contained in MAPEPROOF remains permanently fixed, even after hydration.
It becomes a self-sealing composite which, upon contact with water or the humidity from the ground, is transformed into a gel with excellent waterproofing properties.
It is ideal for waterproofing horizontal and vertical concrete structures in underground environments, such as below bases, on retaining walls, on bulkheads and berlinese coverings, such as underground car parks, basements, swimming pools, underpasses and basements.

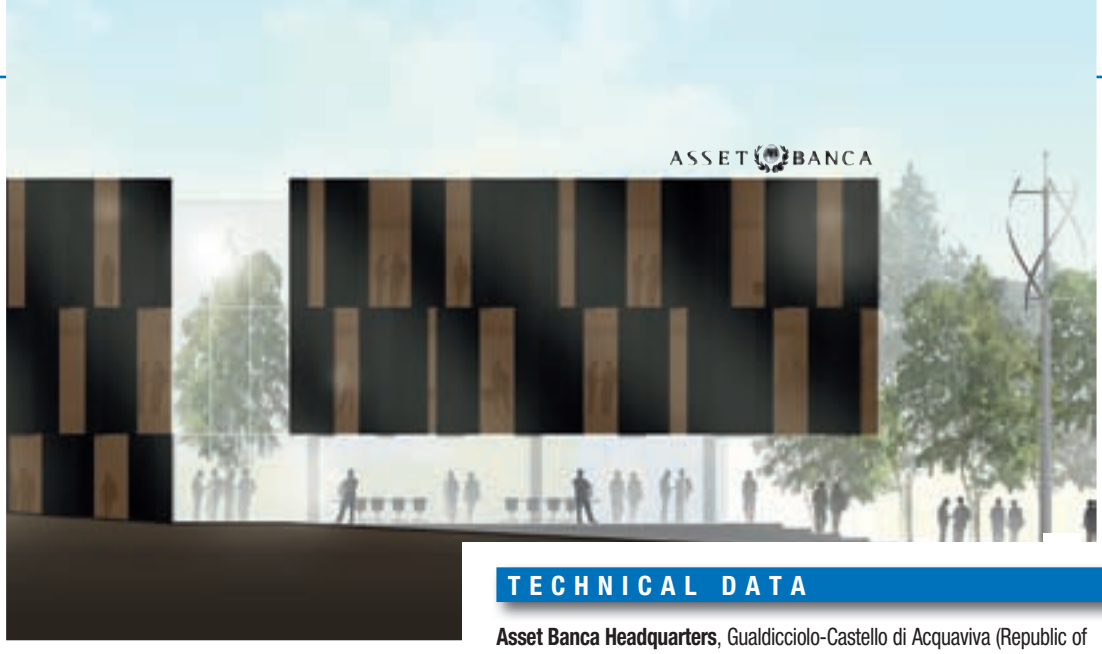

Photo 9. MAPEGROUT 430 was used to smooth over some sections of the vertical surfaces.
Photo 10. The pipework for the geo-thermal heating system before being waterproofed with MAPEPROOF MASTIC.
Photo 11. An image of the road side of the building.

lowing technical specifications recommended by the Mapei Technical Service Department: apart from MAPEPROOF sheets, other products used include MAPEPROOF MASTIC bentonite paste for sealing all the elements which pass through surfaces; MAPEPROOF SEAL for filling voids and cavities in the horizontal surfaces before laying the MAPEPROOF bentonite sheets; MAPEPROOF CD polyethylene washers for fastening the bentonite sheets on the horizontal and vertical surfaces, and IDROSTOP B25 jointing tape for sealing construction joints.

MAPEGROUT 430 was used to smooth over some sections of the vertical surfaces.

The vertical concrete walls to confine the bentonite sheets were made with VISCOFLUID SCC/10, an admixture to increase the viscosity of the mix and improve its stability, homogeneity and strength, and DYNAMON SX, admixture for preparing concrete characterised by high workability and good mechanical performance, were also used.

The building is still under construction and the client has scheduled its inauguration in 2012.


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TECHNICAL DATA

Asset Banca Headquarters, Gualdicciolo-Castello di Acquaviva (Republic of San Marino)
Period of Construction: 2009-2012.

Period of the Intervention: 2009-2010
Intervention by Mapei: supplying products for waterproofing structures built using the top-down technique
Project: arch. M. Dellaros, arch. L. Foschi, arch. A. Gazzoni, Antao Progetti (Republic of San Marino); for the structural intervention: eng. S. Bernardi and eng. M. Mancini
Client: Asset Banca SpA, Republic of San Marino
Works Direction: eng. R. Ragini and arch. M. Dellarosa; for the structural intervention: eng. S. Bernardi
Contractor: Sedi s.a., Serravalle (Republic of San Marino)
Laying Company: Tecnoisolamenti, Monteroberto (Ancona, Italy)
Mapei Distributor: I.E.C., Galazzano (Republic of San Marino)
Distributor of Mapei Admixtures: ICAS (Republic of San Marino)
Mapei Co-ordinator: Dino Vasquez, Andrea Melotti, Fabio Costanzi and Fabrizio Maltoni, Mapei SpA (Italy)

MAPEI PRODUCTS

The products mentioned in this article belong to the "Admixtures for Concrete" and "Products for Waterproofing" ranges. The technical data sheets are available at the web site: www.mapei.com. Mapei plasticizers and superplasticizers for mortars and concrete have been awarded the CE mark in compliance with standard EN 934-2 and EN 932-4. Mapei products for repairing and protecting concrete comply with EN 1504 standards.
More than 150 Mapei products contribute points to obtain LEED (Leadership in Energy and Environmental Design) certification.

Products for waterproofing:

Idrostop B25: hydro-expansive, bentonite jointing tape for sealing construction joints, composed of a mix of natural sodium bentonite and butyl rubber. It can be used to seal second pours of concrete between bases and concrete header walls and between wall and wall.
Mapegrout 430 (CE EN 1504-3, R3): fine-grained, fibre-reinforced, normal-setting thixotropic mortar for repairing concrete.
Mapeproof Mastic: bentonite paste made from natural sodium bentonite and plasticising additives for sealing elements which pass through surfaces.
Mapeproof: bentonite waterproofing sheets for structures below ground level, suitable for both horizontal and vertical surfaces.
Mapeproof CD: washers used to fasten Mapeproof bentonite sheets in place.
Mapeproof Seal: natural sodium bentonite in powder form for localised strengthening of waterproofing layers made using Mapeproof bentonite sheets.

Admixtures for concrete:

Dynamon SX (CE EN 934-2; T 3.1-3.2): modified acrylic super-plasticiser for concrete, characterised by low water/cement ratio, very high mechanical strength and long workability times.
Viscofluid SCC/10: viscosity modifying agent for self-compacting concrete.

Eolic generators concrete bases

In Hungary Mapei contributed to build the concrete foundations of wind turbines

Eolic energy (that is to say energy deriving from wind) is an important source of renewable energy. In fact, eolic generator does not require any type of fuel or combustible. It simply takes the kinetic energy of the wind and transforms it into mechanical energy and then electrical energy. It is also a "clean" energy source, in that it gives off no emissions which are harmful for the environment.

Wind energy has been exploited by man since ancient times through the use of windmills, with the mechanical energy produced used for various applications, such as to grind grain into flour or to pump water. Modern eolic generators, or wind turbines, are made up of a main central support tower with a pod for the blades at the top of the tower. The pod is free to rotate around the tower so that the axis of the blades of the turbine is maintained parallel to the direction of the wind. A rotor is attached to the end of the pod and fibreglass blades are mounted on this rotor. The form of the blades is designed so that when the wind hits the blades, they rotate and cause the rotor to rotate. The rotor transmits the kinetic energy of the wind to a generator connected to a system which then regulates the current from the generator and the production of electrical energy. Eolic generators have either one, two or three blades in various lengths. The most widely used type of eolic generator is around 50 metres tall with two or three blades around 20 metres long, with the tower anchored to a concrete base.

In 2008 the Spanish Iberdrola Renovables began to build in Kisigmànd (in the North West of Hungary) the biggest park of wind power stations of the country, which contains 62 generators of 2 MW capacity. In the first phase (which ended in February 2009) 25 wind turbines were built. The second set of wind power stations was built by the M1 highway. The entire park was completed in 2010.

Photos 1, 2 and 3. DYNAMON SR31 was used for preparing the concrete mix used for building the wind generators' foundations. The use of MAPETARD retardant admixture was recommended for the very hot periods.

Photo 4. View of the wind generators after completion of the works.

Building the Concrete Foundations

The Technical Service Department of Mapei Kft. (the Hungarian subsidiary of the Mapei Group) was requested to propose valuable and long-lasting solutions to build the concrete bases of the second set of wind power stations. The contractor had already worked with Mapei in a previous building project dat-

IN THE SPOTLIGHT

DYNAMON SR31

It is an admixture based on modified acrylic polymers for ready mix concrete. It uses the DPP (Designed Performance Polymer) technology which models the admixture's properties to the specific performance requirements of the concrete. Concretes manufactured with DYNAMON SR31 have a high level of workability (consistency class **S4** or **S5** according to **EN 206-1**), are easy to apply and offer excellent mechanical performance. DYNAMON SR31 is especially suitable for ready-mix concrete and with the need for strong water retention and good development of early mechanical strength. It guarantees good maintenance of initial slump in the different consistency classes even with high ambient temperature. It is particularly suited for self-compacting concrete.


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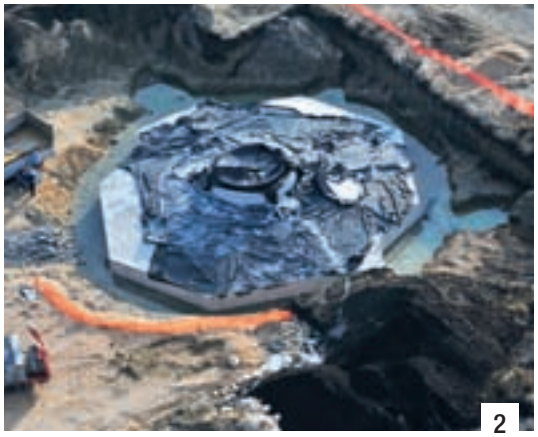
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ing 2008 when DYNAMON SR31 admixture for concrete was used. This is a superplasticizer based on modified acrylic polymers which proved its effectiveness and was again chosen for this intervention.
The aim was to create a concrete mix with low water/cement ratio and long slump retention, which could be produced in big volumes for mass production, so that the concrete layers could be pumped into the hole of the bases. Besides, the concrete mix had to meet other requirements such as high level of workability, ease of application when fresh and excellent mechanical performances after hardening.
DYNAMON SR31 proved to be the ideal choice. Its technical features made it possible for the concrete plants to transport the concrete for long distances, while maintaining its properties and keeping it ready to be mixed.

The concrete supplier's specialists were able to continuously provide the exact amount of admixture and a concrete featuring the same quality in all three plants, without being effected by the transport.
The construction of each wind generator base took about 6-8 working hours. The dosage of the superplasticizer required great care to keep the consistency even and it also required frequent laboratory controls.
The weather circumstances posed one more challenge: quality and proper concrete mix had to be maintained despite the changing weather conditions in summer and in winter. Mapei Technical Service Department suggested using MAPETARD retardant admixture for the very hot periods. This product is specially suitable for preparing concrete mixes in hot months as it can ensures the maintenance of workability for very long times. When using MAPETARD there is no need for works breaks, even in the case of high volume works or long distances transports.
For the concrete mix of the piles MAPEPLAST N11 plasticizing admixture was chosen. This product is ideal for preparing concrete mixes which require a retarded rate of cement hydration at early stage.
The cooperation between Mapei experts and the technicians of the concrete supplier resulted in the supply of a very good concrete mix. Mapei admixtures worked out to be specially suitable to meet all the requirements of the wind generators.

Photo 5. Installing the upper part of the generator on its pylon.
Photo 6. View of the wind power station in Kisigmànd.

TECHNICAL DATA

Concrete Foundations of Wind Generators, Kisigmànd (Hungary)
Period of Construction: 2009-2010

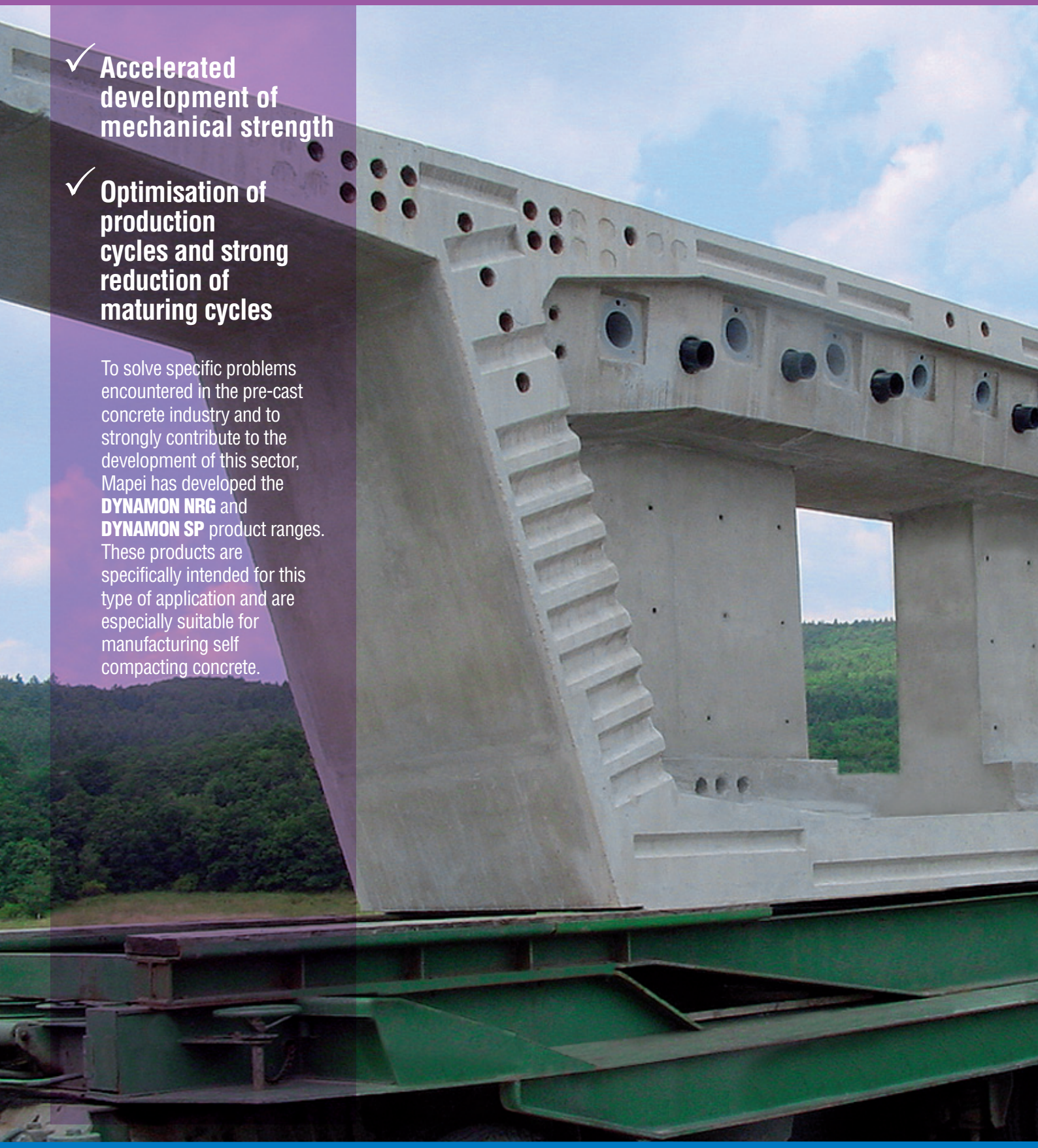
Period of the Intervention: 2009-2010
Intervention by Mapei: supplying admixtures to prepare concrete mixes
Client: Iberdrola Renovables (Spain)
Contractor: Gropius Zrt. (Hungary)
Concrete Supplier: Holcim Zrt. (Hungary)
Mapei Distributor: Holcim Zrt.
Mapei Coordinators: Szautner Csaba, Vilmos Ovàri and Tamàs Dròth - Mapei Kft. (Hungary)

MAPEI PRODUCTS

The products mentioned in this article belong to the "Admixtures for Concrete" ranges. The technical data sheets are available at the web site www.mapei.com. Mapei plasticising and superplasticising admixtures have been awarded the CE mark in compliance with EN 934-2 and EN 934-4 standards. More than 150 Mapei products can contribute points to obtain LEED (Leadership in Energy and Environmental Design) certification.
Dynamon SR31 (CE EN 934-2, T11.1-11.2): superplasticizer based on modified acrylic polymers for concrete with low water/cement ratio and long slump retention.
Mapeplast N11 (CE EN 934-2, T2): liquid plasticizing admixture for concrete with slow slump loss. N.B. The product is manufactured and distributed in Hungary by Mapei Kft, the Hungarian subsidiary of the Group. On the other markets Mapeplast N10 is available.
Mapetard (CE EN 934-2, T8): retardant admixture for concrete and mortar with a plasticising effect.Particularly suitable for use in summer to help maintain workability of the mix.

Dynamon NRG & Dynamon SP

Solutions specially designed for the pre-cast concrete industry



- ✓ **Accelerated development of mechanical strength**
- ✓ **Optimisation of production cycles and strong reduction of maturing cycles**

To solve specific problems encountered in the pre-cast concrete industry and to strongly contribute to the development of this sector, Mapei has developed the **DYNAMON NRG** and **DYNAMON SP** product ranges. These products are specifically intended for this type of application and are especially suitable for manufacturing self compacting concrete.

Renovating wiring pylons foundations

Mapei products were used to repair the foundations of 213 electric wiring pylons in Hungary

About 3 years ago Mapei Kft., the Hungarian subsidiary of the Mapei Group, contacted Mavir Zrt., a local company in charge of electric energy transmission, and proposed a complete system for concrete repair. At the end of 2009, after more meetings, Mapei products were chosen to renovate the foundations of 213 pylons of 400 kV wiring pylons along a long distance power line between the two Hungarian cities of Györ and Litér.

These pylons are transmission towers made up of a tall steel structure, used to support overhead electricity conductors for electric power transmission.

The concrete foundations of the pylons are exposed to the rigours of weather circumstances (wind, rain, freezing, temperature changes etc.), as most of these pylons stand in the middle of meadows or arable lans.

Therefore it is very important to choose the proper materials to apply onto the pylons bases and to plan a professional restoration intervention to provide perfect and long-lasting protection, preventing the need for further frequent rennovation works and extra expenses.

The system proposed by Mapei included PLANICRETE, MAPEFER 1K, PLANITOP 430, MONOFINISH, ELASTOCOLOR PRIMER and ELASTOCOLOR PAINT. It ensured the completion in June 2010 of the rennovation works which had begun in April.

A Complete Renovation

The concrete foundations were cleaned by sand-blasting or mechanical tools to remove the dirt, the coating resulting from the previous rennovation, and the loose parts.

Some steels reinforcement rods become visible during cleaning process. They were cleaned from the-rust and treated with MAPEFER 1K one-component, anti-corrosion cementitious mortar to protect them against corrosion. The product was applied in 2 layers by brush.

For some of the foundations a complementary reinforcement was needed: a metallic mesh was anchored into the base.

In order to improve the adhesion of the new concrete layer


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Photo 1. One of the 213 wiring pylons which make up the long distance power line between the two Hungarian cities of Györ and Litér.

Photo 2. PLANICRETE, mixed with cement


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to the existing concrete surface, a bonding slurry was prepared with PLANICRETE synthetic latex rubber diluited with water with a mixing ratio of 1:1.
The repairing mortar was then applied with the "wet-to wet" technique. For rough repair of most of the foundations PLANITOP 430 fine-graded, controlled-shrinkage, fibre-reinforced, thixotropic mortar was chosen. Before applying it, the surface to be repaired had to be rough, solid and saturated with water.
In most cases one (max. 35 mm) layer was applied on the foundations. As the granulometry of the PLANITOP 430 aggregates is quite fine (about 1 mm), after the application the surfaces could be smoothened without the need of using a smoothing compound.
MONOFINISH one-component, normal-setting cementitious mortar was only used for the surfaces which required a new concrete layer. The product was applied in one layer of-up to 3 mm thickness onto clean and solid substrates.
2 or 3 days after completion of the repair works, the surfaces were treated with ELASTOCOLOR PRIMER. Once they were dried (after about 4-6 hours), two layers of ELASTOCOLOR PAINT elastomeric, crack-bridging, permanently flexible, protective paint were applied with a 24 hour interval between each coat. The colour difference between the two layers helped the completion of the finishing operations.

and water, was used to prepare a bonding slurry to enhance the adhesion of the new concrete layer applied with the "wet-to-wet" technique.
Photos 3, 4 and 5. PLANITOP 430 fibre-reinforced thixotropic mortar was chosen for repairing most of the pylons foundations.
Photos 6 and 7. ELASTOCOLOR PAINT was applied on the repaired surfaces as a protective and decorative finishing.

TECHNICAL DATA

Wiring Pylons Foundations along the power line between Győr and Litér (Hungary)
Period of the Intervention: April – June 2010

Intervention by Mapei: supplying products for repairing concrete and finishing the surfaces
Project: Ovitz Zrt. (Hungary)
Client: Mavir Zrt. (Hungary)
Works Direction: EKS Service Kft. (Hungary)
Contractor: EKS Service Kft.
Mapei Distributor: Lendl Kft. (Hungary)
Mapei Co-ordinator: Balázs Dubrovszki, Mapei Kft. (Hungary)

MAPEI PRODUCTS

The products mentioned in this article belong to the "Building Speciality Line" range. The technical data sheets are available at the web site www.mapei.com. Mapei products for the protection and repair of concrete surfaces and structures have been awarded the CE mark in compliance with EN 1504 standards. More than 150 Mapei products can contribute points to obtain LEED (Leadership in Energy and Environmental Design) certification.
Elastocolor Paint (CE EN 1504-2, coating **(C)** principles **PI, MC** and **IR):** elastomeric, crack-bridging, permanently flexible, protective paint with high resistance to chemicals for internal and external surfaces.
Elastocolor Primer: synthetic resin primer in solvent specifically formulated to guarantee excellent insulation and improve the bond of Elastocolor Paint, Elastocolor Rasante and Elastocolor Rasante SF to the substrate. May also be used as a curing agent for repair mortar.
Mapefer 1K (CE EN 1504-7): one-component, anti-corrosion cementitious mortar for steel reinforcement rods.
Monofinish (CE EN 1504-3, principles **MC** and **IR; CE EN 1504-3, R2):** one-component, normal-setting cementitious mortar for smoothing concrete and cementitious renders. N.B The product has been substituted by Mapegrout 430.
Planicrete: synthetic latex rubber to improve adhesion and strength of cementitious mortars.
Planitop 430 (CE EN 1504-3, R3; EN 1504-9): fine-graded, controlled-shrinkage, fibre-reinforced, medium-strength (30 MPa) thixotropic mortar for restoring concrete.

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Yalu highway bridges

Mapei DYNAMON admixtures were used to build four bridges along the Yalu highway in the Chinese Province of Sichuan, including the highest pier in Asia

The Yalu highway is located in the Liangshan state, near Ya'an city, in the southwest of the Sichuan Province in the People's Republic of China. It is one of 7 highways converging on Beijing (Peking) and belonging to the "Network 7918". This project is planned to be completed by 2034 and also includes 18 Chinese highways linking eastern to western areas, for an overall length of 85,000 km. The complete length of the Yalu highway is about 240 km. The total investment for its construction amounted to approximately 16.4 billion Renminbi (approximately 1.854 billion Euros).

A Tradition of Admixtures

Mapei, whose admixtures for concrete are well known in China, contributed significantly to this important project.

Indeed, the Company first broke into the Chinese market in the late 1990s when it began supplying admixtures from the MAPEFLUID line for important Chinese building projects, first and foremost the Three Gorges Dam (see *Realtà Mapei International* n. 20)

Mapei's so called "1st generation" superplasticizers' reliability and performances impressed Chinese experts of the building and concrete industry right away. These products have the capacity of reducing the amount of water used for mixing concrete and guaranteeing its high mechanical strength and extended workability retention. Later Mapei, which in China owns three subsidiaries and two manufacturing plants (with one of them, located in Shanghai, devoted to admixtures' production), introduced into China the 3rd generation of Mapei nanostructural admixtures, which belong to the DYNAMON SYSTEM.

These admixtures were also used for the concrete for building several of the bridges along the Yalu highway.

The DYNAMON SYSTEM is a range of concrete admixtures with very high technological content enabling extraordinary performance levels to be attained. It includes acrylic superplasticizers for the elimination of steam curing in precast industries and for the prolonged retention of workability in ready-mix concrete.

In this case Mapei modified acrylic superplasticizers DYNAMON SX-C18, DYNAMON SX C-16 (which were especially formulated by Mapei Construction Materials Shanghai Co. Ltd.) and DYNAMON SP1 were used for formulating concrete mixes characterised by very high mechanical strengths.

The most challenging section of the highway was C4 section which stretches for 3.7 km and includes the Labajin bridge, Heishigou bridge, Tianpingzi no.1 bridge and Tianpingzi no. 2 bridge.

The Labajin bridge is the most spectacular one with the highest pier featuring a height of 182.5 m, making it the tallest one in Asia. The total length of Labajin bridge is 1.4 km with a main span measuring 20 m.

In order to better explain the

View of the Labajin bridge, located along the C4 section of the Yalu highway, after completion of the works.

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advantages provided by the use of Mapei admixtures, the experts of its Shanghai-based subsidiary (Mapei Construction Materials Shanghai Co. Ltd.) organized a technical seminar at the job site. The event was attended by the contractors and operators involved in this project.
When performing on-site tests, Mapei admixtures stood out for their stability and workability.
All the tests needed for qualifying the mixes were performed, such as the "slump-flow" test, to make sure that the mix had the required fluidity characteristics and that it could completely fill the form-work without bleeding or segregation.

Photos 1 and 2.
Mapei experts held a technical seminar at the job site to better explain the advantages provided by the use of Mapei DYNAMON modified acrylic super-plasticizers.
Photos 3, 4, 5 and 6.
The "slump-flow" test was carried out on site before casting the concrete to make sure that the mix had the required fluidity characteristics, and that it could completely fill the form-work without bleeding or segregation.
Photos 7, 8 and 9.
Some samples were prepared on site to make sure that the mixes featured the required mechanical strengths.
Photo 10.
The Labajin bridge encloses a pier featuring a 182.5 m height, making it the tallest one in Asia.

IN THE SPOTLIGHT

DYNAMON SP1

It is an admixture based on modified acrylic polymer specially designed for the precast concrete industry. It features the DPP (Designed Performance Polymer) technology that can model the admixture's properties in relation to the specific performances required for concrete.
Concrete mixes with DYNAMON SP1 have a high level of workability (consistency class **S4** or **S5**, according to **EN 206-1**), and are consequently easy to apply when fresh. They also offer excellent mechanical performances when hardened.
DYNAMON SP1 is especially suitable for precast concrete and wherever there is the need for a strong water reduction, along with a relatively high acceleration of mechanical strengths at an early age in different consistency classes and at curing temperatures above +15°C or with accelerated steam curing treatment.
Its performance makes it particularly suitable for manufacturing self-compacting concrete since DYNAMON SP1 can ensure high workability without significantly slowing down the development of mechanical strengths at early age.
It is particularly suitable for manufacturing pre-stressed reinforced concrete beams and roofing slabs, cladding panels, and self-compacting concrete for precasting.

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Photos 11, 12 and 13.
Mapei admixtures DYNAMON SX-C18 and DYNAMON SP1 were used to prepare the concrete mix for building the Labajin and Heishigou bridges.

regation. Moreover, all the tests were performed to make sure that the mixes featured the required mechanical strengths.
Besides all the efforts mentioned before, Mapei also offered highly qualified technical support which contributed to having its solutions chosen for the Yalu highway project. Consequently, a total of 2,000 tons of Mapei admixtures have been used for producing the concrete for building the Labajin and Heishigou bridges.
Mapei solutions helped preparing the concrete for the two bridges' steel tubular columns, platforms, pier shafts, and box girders, as well as for the C80 class concrete (whose resistance to compression is 2-3 higher than traditional concrete mixes) used for filling the steel pipe columns.
In order to avoid that water evaporated too quickly from the mix, large cushion caps were used as protective elements, thereby speeding up the progress of construction as well as saving costs.
Mapei modified acrylic superplasticizer for concrete DYNAMON SX-C16 (which is characterised by low water/cement ratio, different from DYNAMON SX-C18) was used for preparing the concrete for building several elements belonging to other bridges along the Yalu highway.
After completion of the works, the client was so satisfied with Mapei admixtures that he issued a declaration claiming that the Company's products fully met the projects' needs and were able to provide the concrete mix with excellent durability, ease of use, resistance to cracks, stability and mechanical strengths.

TECHNICAL DATA

Bridges (including Labajin, Heishigou, Tianpingzi n.1, Tianpingzi n. 2) along the Yalu highway, Ya' an (People's Republic of China)
Period of Construction: January 2008 – November 2010
Intervention by Mapei: supplying admixtures for concrete for building several bridges
Client: Sichuan Province Transport and Communication Bureau
Contractors: China Road and Port Group Corporation, China Road and Bridge Corporation, Sichuan First Highway Engineering
Project: China Road and Bridge Corporation
Mapei Distributor: Chengdu Balance Gold
Mapei Co-ordinator: Anderson Fu, Mapei Construction Materials (Shanghai) Co. Ltd. (People's Republic of China)

MAPEI PRODUCTS

The products mentioned in this article belong to the "Admixtures for Concrete" line. Mapei plasticizers and superplastcizers for concrete have been awarded the CE mark in compliance with EN 934-2 and EN 934-4 standards. The technical data sheets are available at the web site: www.mapei.com. More than 150 Mapei products can contribute points to obtain LEED (Leadership in Energy and Environmental Design) certification.
DYNAMON SX C-16: modified acrylic super-plasticizer for concrete, characterised by low water/cement ratio, very high mechanical strength and long workability times. N.B This product is manufactured and distributed on the Chinese market by Mapei Construction Materials (Shanghai) Co. Ltd, the Group's Shanghai-based subsidiary.
DYNAMON SX C-18: modified acrylic super-plasticizer for concrete, characterised by low water/cement ratio, very high mechanical strength and long workability times. N.B This product is manufactured and distributed on the Chinese market by Mapei Construction Materials (Shanghai) Co. Ltd.
DYNAMON SP1 (CE EN 934-2, T 3.1-3.2-7): acrylic-based super-plasticizing accelerator.

Mapei wall coatings line

New packaging for high quality products

While the coloured coatings sector is considered to be a world in itself, attention is scarcely paid to the surfaces on which the coatings are applied and with which they interact, determining the overall durability and quality.

Since the 1940s Mapei offers a wide range of dedicated mortars, renders, smoothing compounds and finishing products which make up an Integrated Application System. Mapei's Wall Coatings Line has further evolved and now, to make sure that everybody can fully appreciate their full potential and to offer an immediate insight into the vast line of solutions for installers, its packaging has also been updated.

The packaging of the Coatings Line has been updated to meet the following requirements: to translate the high technological content of the line into a high-impact "visual" message and show how the specific nature of each product fits into the global "Mapei System" concept.

Unlike the vast majority of manufacturers of paints and varnishes, which traditionally offer a "coloured skin" for façades with no particular distinction between the various products, the philosophy behind Mapei's Coatings Line has introduced a completely new and innovative approach on the market. "Colouring" is no longer a distinct, separate operation, but is now part of a "system" or cycle which spans from interventions on the structures themselves to the mortars applied, and from smoothing and levelling compounds to primers. Apart from being conceived to guarantee that they are compatible with each other, the Mapei Coatings Line allows you to choose from products which have also been conceived to form a unique, single body.

Above.
A detail view of the Sikania touristic resort located in Gioiosa Marea (Province of Messina, Italy) where Mapei coatings were widely used.

High Quality: a Hallmark of Mapei

Packaging which is easy to recognise and more functional.

The Mapei Coating Line today is presented with completely new packaging to emphasise the products and solutions so that designers may exploit their creativity to the full, safe in the knowledge that only high-performance materials and products will be used. Mapei has undertaken a complete new restyling of the image, including each product's container and graphics, fully aware that packaging is fundamental for a product to make it easier to use, easier to identify and, well….just more attractive. Particularly noteworthy are the functional characteristics of the new containers, which are now easier to open and close and are much more durable. The new packaging is also easy to recognise at a distance, while up close each one is easy to read, thanks to an efficient restyling of the labels.

Different colours are now used to identify each specific range from the overall line (such as SILEXCOLOR, QUARZOLITE and ELASTOCOLOR) while other colours are used to identify the type of product (PAINT, PRIMER, BASE COAT, etc.).

The most important descriptions and performance characteristics are also in the foreground and easy to read. The label also includes a picture of the tool which is most commonly used for applying each specific product along with a reference picture of where the product has already been applied.

On the back of the package, the most important instructions are listed in 12 different languages.

Through the new packaging, the aim of the launch of the new-look Mapei Coatings Line is not only to capture the attention and influence our clients into deciding to purchase a given product, but it is also intended to underline the high quality and efficiency of the most highly evolved products currently available for this sector.

You can tell this is Mapei.

Quarzolite Range

Acrylic resin-based system in water dispersion with micro-granular quartz with high filling properties, for painting all the wall surfaces.

Elastocolor Range

Elastomeric acrylic resin-based system in water dispersion, for protecting reinforced concrete surfaces and all types of wall surfaces.

Colorite Range

Pure acrylic and vynil resin-based system in water dispersion, for protecting and decorating internal and external surfaces.

Silexcolor Range

Modified potassium silicate-based system in water dispersion, for protecting and decorating renders.

Dursilite Range

Washable modified acrylic system in water dispersion, for protecting and decorating internal and external surfaces.

Silancolor Range

Highly water repellent siloxane resin-based system in water dispersion for protecting and decorating all types of wall surfaces.

Mapei Wall Coatings Line.

Mapei Wall Coatings Line packaging now features a light-blue colour to highlight the products' high tech contents and the specific solutions offered by the line within the **"Mapei systems"**.
A complete line of coatings for professional use with a high-impact visual message, available on the building site and in the sale points.

REACH: taking action without stifling businesses

From 1st December 2010 it is no longer possible for European companies to manufacture and import products which are not registered with the European Chemicals Agency (ECHA)

Another decisive step forward has been taken in securing those chemicals which are most harmful to people and the environment: European companies can no longer manufacture and import products unless they were registered with the European Chemicals Agency (ECHA) by 30th November 2010 (see the table on the following page). This deadline was set as part of operations to enforce the REACH Regulation (Registration, Evaluation and Authorisation of Chemicals) for controlling chemical substances. Approximately 3400 chemical substances manufactured and imported into the European Union in quantities of over 1000 tonnes-a-year or falling within specific hazard ratings have already been registered with the European Chemicals Agency.

This is the result of the third phase (the first truly operative stage for companies) foreseen by the aforementioned regulation concerning the registration, evaluation, authorisation and restriction of chemicals.

The legislative text of REACH – published in the European Union Official Journal of 29th May 2007, which actually came into effect on 1st June 2007 – calls for a review of over 40 European standards currently in force, also widening the field of application of the procedures governing the manufacture, importing and use of chemical substances, which in Italy alone involves over 2000 chemicals companies and over 100,000 businesses involved in industrial transformation. Registration obligations will force companies handling chemicals to evaluate the risks these substances entail and then duly inform users about them, so that they can take all the necessary measures.

The purpose of REACH is to set up one single registration and evaluation system for the approximately 30,000 "existing" (or "phase-in") chemical substances (i.e. those launched on the market before September 1981) and also "new" substances (or "non phase-in", launched after September 1981), in order to guarantee greater health protection for both people and the environment.

The new system means that anybody manufacturing or importing a given substance – as such or contained in some product formulas or items – in quantities equal to or above 1 tonne-a-year must register it with the European Chemicals Agency.

Companies reacted well to the deadline of 30th November 2010, which was the first real challenge set by REACH: approximately 25,000 registration dossiers were presented. Big businesses were very much to the fore during this initial registration stage, actually accounting for 86% of the dossiers sent to ECHA.

1st December 2010 was unquestionably the most important date on the calendar this year for several thousand businesses supplying chemical substances to the European Union, and not just because it was the date of the first deadline for registration, but also because it marked other significant deadlines for industry: the modifying of security data sheets for substances in accordance with the new REACH provisions and compulsory registration at ECHA of hazard rating for substances launched on the market, as set down by the new European CLP regulation (classification,

Right.
Schedule for implementing the REACH Regulation involves further registrations in 2013 and 2018 for manufactured and imported substances.

REACH SCHEDULE FOR REGISTERING PHASE-IN SUBSTANCES

30th November 2010:
- substances manufactured/imported in quantities equal to or over 1000 tonnes-a-year;
- Class 1 and 2 CMR (carcinogenic, mutagenic and reprotoxic) substances manufactured/imported in quantities equal to or over 1 tonne-a-year;
- R50/53-classed substances (highly toxic for aquatic organisms, which may have long-term negative effects on the aquatic environment) manufactured/imported in quantities equal to or over 100 tonnes-a-year;

31st May 2013:
- substances manufactured/imported in quantities of between 100 and 1000 tonnes-a-year;

31st May 2018:
- substances manufactured/imported in quantities of between 1 and 100 tonnes-a-year.

(source: REACH Centre)

labelling and packaging of chemicals).
More work still needs to be done and new deadlines will soon be facing European industry: reviewing of the REACH Regulation by June 2012 and the second phase-in REACH registration for substances manufactured/imported in quantities of between 100 and 1000 tonnes-a-year to be registered by 31st May 2013, which will involve a greater number of small and medium-size businesses. As the Vice President of the European Commission for Industry and Entrepreneurship, Antonio Tajani, pointed out, "REACH is an excellent example of integrated industrial policy capable of giving priority to competitiveness and sustainable development within the framework of EU 2020 strategy".
"Over the next few years – so the EU Commissioner for the Environment, Janez Potočnik, said for his part – knowledge gained thanks to REACH will lead to further progress in terms of safety, less chemical pollution, "green" options taken by consumers and businesses and, generally speaking, a cleaner environment".

Federchimica's Role

Federchimica, the Italian Federation of the chemical companies, has played an important part in encouraging associated businesses to register.
Over the last year alone, ten information/training events have been organised for managers and officers working for public administrations and eight guidelines have been set for enforcing the REACH Regulation. Help desks and Emergency Units (assisting businesses even on Saturdays and Sundays) have also been set up, which have jointly contributed to handling over 1500 applications for help. It should not be forgotten that Federchimica has also set up a REACH Centre to deal with companies' demands more effectively.
Back last September, in conjunction with a meeting held in Brussels to take stock of how REACH was being implemented, Giorgio Squinzi, President of Federchimica and Head of Confindustria (the Italian Federation of Manufacturers and Service Companies)'s Technical Committee for Europe, praised Tajani "for efforts that have been made to make it easier for small and medium-sized businesses to implement REACH".
Actual cooperation between authorities and businesses has, in this case, produced good results, considering all the difficulties involved in implementing REACH, the most complicated regulation ever devised for governing the manufacture and use of chemical substances. "Our companies – so Squinzi stated – are making tremendous efforts to meet the deadlines set by REACH. However, we often have to deal with some extremely tricky procedural issues, which produce uncertain results and turn out to be particularly costly, mainly for small and medium-size businesses". For this reason the path which needs to be taken, according to Squinzi, must lead to a "simplifying and grouping together of regulations in order to come up with codes which are easier and quicker to read and interpret for everybody".
The chemicals industry is a driving force because it provides the European industry with cutting-edge solutions, materials and technology, as well as with sustainable responses to global environmental issues. For this very reason, Squinzi openly avows that "we all want REACH to be enforced not only as correctly as possible, but also on a more practical basis and at reasonable costs. Companies are committed in this direction, but they expect everybody with some sort of responsibility on a European scale to support them".
With this in mind and as President of Cefic (European Chemical Industry Council) – which 29,000 companies operating in Europe belong to, representing a quarter of the world production of chemicals and employing approximately 1,200,000 staff – Squinzi claimed that the association is committed along with the European Commission "to improving the regulation when it is revised in 2012. This should not increase the burden on small and medium-size companies".
In conclusion, Squinzi has a very clear vision, which, in a nutshell, frames this key issue for the future not just of the chemicals industry but manufacturing as a whole: "Europe needs a global REACH, otherwise it will loose competitiveness in the long run. Growth cannot be stifled by administration complications which could be eliminated at zero cost".

International Year of Chemistry 2011

Chemistry: our life, our future

Despite being criticized by prejudices, feared at schools and never well understood in its real essence, chemistry finally got the attention it deserves: 2011 is the International Year of Chemistry, a worldwide celebration of the achievements of chemistry and its contributions to the well-being of humankind.

The IYC 2011 is an initiative of IUPAC, the International Union of Pure and Applied Chemistry, and of UNESCO, the United Nations Educational, Scientific, and Cultural Organization. It involves chemical societies, academies, and institutions worldwide, and relies on individual initiatives to organize local and regional activities.

Under the unifying theme "Chemistry - Our Life, Our Future," IYC 2011 will offer a range of interactive, entertaining, and educational activities for all ages all over the world. The event is intended to reach across the globe, with opportunities for public participation at the local, regional, and national level.

The goals of IYC 2011 are to increase the public appreciation of chemistry in meeting world needs, to encourage interest in chemistry among young people, and to generate enthusiasm for the creative future of chemistry.

The year 2011 will coincide with the 100th anniversary of the Nobel Prize awarded to Madame Marie Curie: an opportunity to celebrate the contributions of women to science. The year is also the 100th anniversary of the founding of the International Association of Chemical Societies (IACS) which, just like IUPAC, was founded to meet the needs of scientific communication on an international level, promoting cooperation among chemical experts and defining common language and terms.

"The International Year of Chemistry will give a global boost to chemical science in which our life and our future are grounded. We hope to increase the public appreciation and understanding of chemistry, increase young people's interest in science, and generate enthusiasm for the creative future of chemistry," declared the President of the International Union of Pure and Applied Chemistry (IUPAC), Professor Jung-Il Jin.

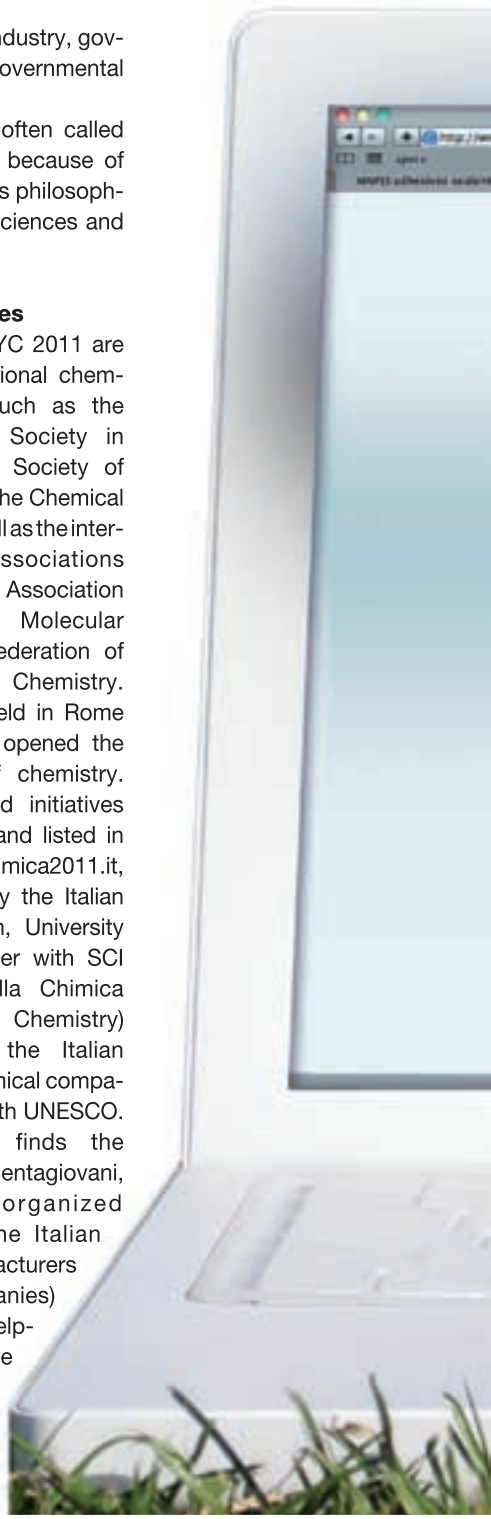
"I welcome the opportunity to celebrate chemistry, one of the fundamental sciences," said the Director-General of UNESCO, Koïchiro Matsuura. "Raising public awareness about chemistry is all the more important in view of the challenges of sustainable development. It is certain that chemistry will play a major role in developing alternative energy sources and in feeding the world's growing population" he added.

IYC 2011 events will emphasize that chemistry is a creative science essential for sustainability and improvements to our way of life. Activities, such as lectures, exhibits, and hands-on experiments, will explore how chemical research is critical for solving our most vexing global problems involving food, water, health, energy, transportation, environmental protection, economic development and more. The Year of Chemistry will help enhance international cooperation by serving as a focal point or information source for activities by national chemical societies, educational institutions, industry, governmental, and non-governmental organizations.

Indeed, chemistry is often called "the central science" because of its study encompasses philosophical issues, physical sciences and applied sciences.

Events and Initiatives

The main events of IYC 2011 are organized by the national chemistry associations, such as the American Chemical Society in the USA, the Royal Society of Chemistry in the UK, the Chemical Society in Brasil, as well as the international chemical associations such as the European Association for Chemical and Molecular Sciences and the Federation of African Societies of Chemistry. In Italy a congress held in Rome in February officially opened the international year of chemistry. Plenty of events and initiatives are being organized and listed in the website www.chimica2011.it, which is promoted by the Italian Ministry of Education, University and Research together with SCI (Società Italiana della Chimica - Italian Society of Chemistry) and Federchimica, the Italian Federation of the chemical companies, in partnership with UNESCO. Among them one finds the Giornata Nazionale Orientagiovani, a one-day event organized by Confindustria (the Italian Federation of Manufacturers and Service Companies) for informing and helping the young people in finding their way in the world of chemistry; the Italian national chemistry week, to be held in



Below.
The home page of the website www.chemistry2011.org devoted to the events organized for this year.

October, which aims at developing close contacts between the general public and the world of chemistry; the "Tutti pazzi per la chimica!" (All mad about chemistry) national contest whose goal is to develop knowledge about chemistry and improve its perception especially among the young people; the opening of the chemical manufacturing plants under the initiative "Fabbriche aperte" which also involves Mapei. Its 5 Italian manufacturing units will be opened to the general public in the month of May.

International Year of CHEMISTRY 2011

FABBRICHE APERTE

FEDERCHIMICA

FEICA - European Adhesives & Sealants Conference 2010

The annual conference was held in Helsinki, the capital of sustainable development

by Roberto Leoni*

The Scandic Marina Congress Center in Helsinki hosted FEICA's annual conference, the Association representing European adhesives and sealants manufacturers, on 17th September 2010.

Helsinki was chosen due to its symbolic value for chemical industry. The world's second most northern capital is buried in forests and parks and surrounded by plenty of little islands. The beauty of the nature blends in seamlessly with high-tech design. Over 90% of buildings are equipped with cogeneration and tele-heating systems, while all their technical devices for saving water and their wastewater treatment systems are among the most advanced in the entire world. In 2000 Helsinki earned the title of the cleanest capital in the European Union due to its attention to environmental issues. Helsinki embodies all those principles on which future developments in the realm of adhesives are based and reflects the challenges chemical industry is having to face: innovation, sustainability and European legislation. Helsinki is also the home of ECHA, the European Chemicals Agency, which is responsible for handling thousands of registrations of chemicals as stipulated in the REACH Regulation, which bans the manufacture, trading or use of chemical products whose hazard rating has not first been assessed and which is destined to change the face of the European chemicals industry over coming years.

The private part of the conference was held on the 14th-15th September. Italy was represented by Biagio Savarè and Susy Tralongo, respectively the President and Secretary of the AVISA (Italian Association of Paint, Ink, Sealants and Adhesives Producers) Adhesives and Sealants Group, and myself, Roberto Leoni, as a member of FEICA's Executive Board and European Technical Board. In the technical committee priority has been given to projects for implementing REACH, the standards governing contact with foodstuffs, and the contribution of adhesives to sustainable development.

Over the subsequent two days the public part of the Conference tackled all the very latest issues affecting chemical industry on a global scale, in the presence of 250 delegates from 16 European countries and also the USA, China, South Korea and Turkey.

During the plenary session held on 15th September, after the President of FEICA, Will Barclay, gave his introductory speech, Geert Dancet, Executive Director of ECHA, took the stage and reminded the forthcoming deadlines not just for the REACH Regulation but also the new regulation for classifying, labelling and packaging chemicals ("CLP" described in the previous article). The plenary session closed with Gabor George Burt's speech. Burt is an expert in strategy and innovation and author of the book *Blue Ocean Strategy* on the development of new markets while making competition irrelevant. Some fine speeches were also given by the English economist Roger Martin-Fagg, who talked about the effects of the US financial crisis on the world economy and, in particular, on the adhesives and sealants industry, and by Kjetil Sandermoen, a corporate structuring consultant, who talked about executive management during periods of radical transformation like the present.

Proceedings climaxed the next day with the Business Forum entitled "From Recession to Recovery", when the President of Federchimica (the Italian Federation of the chemical companies) and of the Mapei Group, Giorgio Squinzi, took the stage. The, at that time newly designated President of CEFIC, the European Chemicals Industry Council, gave an introductory speech about the Group's growth, setting it within the wider context of economic workings worldwide. Squinzi emphasised that the worldwide economic recovery, which began over the first few months of 2010, slowed down during the second half of the year and that the forecasts for 2011 were not very comforting.

Growth will be probably slower in Europe, particularly in the European Union, than in the other continents and the possibilities for growth are linked to the internationalisation and innovation capacity of businesses.

Special emphasis was focused on the importance of innovation in the name of sustainable growth and on the fact that the Mapei Group already concentrates 70% of its investments in research along these lines.

All the speakers attending the Forum contributed then to a lively "Panel Discussion" concluding the meeting.

In 2011 the European Adhesives & Sealants Conference will be held in Valencia (Spain) from 13th to 16th September.

** Mapei SpA HSE and Regulatory Affairs Corporate Manager*