

# Realtà MAPEI

AMERICAS

**Tunneling materials,  
admixtures and marine products  
– Part of our new normal**

**ISSUE 26**

## The 'new normal' for MAPEI



**Luigi Di Geso**  
President and CEO,  
MAPEI North America

As we end the year of our 80<sup>th</sup> anniversary and MAPEI starts a new chapter for North America, we have overcome several environmental difficulties in the form of unbelievably “bad weather” (read about it on Page 6). However, our American dream shines bright, with plans that include both growth and expansion.

If you were in the construction industry 40 years ago (which is half a lifetime for MAPEI), you would have normally seen our company as a supplier of adhesives, mortars and grouts for the flooring sector. Thanks to research & development into innovative technologies, careful strategic planning and diversification by our leadership, and a sound plan for internationalization, MAPEI today is thriving and growing in areas that represent the “new normal” for us in North America.

The company has acquired manufacturing sites for admixtures in the midwestern United States and has expanded manufacturing for these products across the country. Concrete admixtures are now a part of the product portfolio in Canada too.

Looking beneath the ground and out to sea for new opportunities, MAPEI has focused its innovative research & development on solutions for our Underground Technology Team and has developed a collection of products and systems uniquely for use in the marine industry.

Details on these exciting new product categories for MAPEI North America can be found in the articles that appear throughout this issue of *Realtà MAPEI Americas*.

In this issue, you can also see how MAPEI has advanced into areas as diverse as superplasticizers and social media. Every part of our company is busy working on that new normal – marketing, sales, research & development, accounting, logistics, environmental health & safety, quality management, technical services and product support, human resources and, of course, operations.

And, though we are a hard-working bunch here at MAPEI, we still have time to show our sense of humor. I invite you to read the first of MAPEI's short stories of “Tall Tales,” which appears on pages 38-39. We'll be publishing more of them in future issues. I hope you enjoy them as much as I do.

My hope for you as we close this year is that you will follow the MAPEI path to a successful “new normal” for your business – work hard, play hard and always take care of your family!

Sincerely,

A stylized, handwritten signature in black ink, appearing to read 'Luigi Di Geso'.

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**Giorgio Squinzi,**  
Managing Director of  
Mapei S.p.A.

## OUR AMERICAN DREAM

Giorgio Squinzi, the head of the Squinzi family and the head of MAPEI Group, led the dream of a MAPEI presence in North America into the realm of reality and success. This year, as we celebrate our 80<sup>th</sup> anniversary of the founding of MAPEI Group, he reflects on the results that the company has achieved in North America and on the new targets that we hope to reach in the coming years:

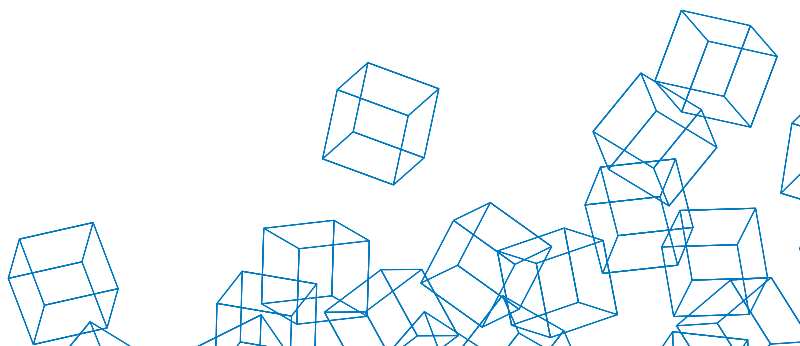
The North American market has been extremely successful for us over the past few years and is continuing to grow in the industry sectors we serve. In accordance with MAPEI Group's global growth strategy, we plan to continue investing over the medium/long term in this geographical area, where we are such an important player.

We plan to follow this growth partly because this is where MAPEI's internationalization process first began. Together with the constant quest for innovation through research & development, internationalization has allowed our company to grow successfully around the world and become a benchmark in the realm of chemical products for the building industry.

Briefly retracing the initial steps in MAPEI's successful venture into the New World is not just a pleasant reminder of what we have achieved – it is also proof that dreams really can come true under certain circumstances.

MAPEI's internationalization first began on American soil under the lucky star of sports, indeed under the auspicious multicolored Olympic rings.

“Our American dream” began back in 1976 at the Montreal Summer Olympic Games, in which MAPEI was involved with its products for laying the Olympic track. This was my first exciting direct contact with the American market. I went to Montreal in person to watch the installation of the track and immediately realized the potential of the Canadian and United States markets.





Ideas immediately turned into concrete facts with an initial investment in Canada to construct a manufacturing plant that opened in Laval, Quebec, in 1978. This favorable beginning was soon followed by the addition of factories in the United States: in Tempe, Arizona, in 1984 and in Chicago, Illinois, in 1985. What seemed like a relatively quiet start soon produced a barrage of great results that led to more and more new investments and acquisitions.

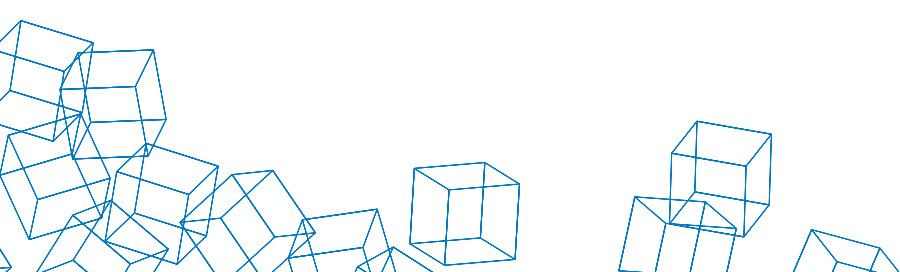
MAPEI North America is a success story that is continuing. Nowadays, the MAPEI Group can boast a multifaceted organization of 19 factories in North America: 10 in the USA, 5 for its associate company Polyglass, 4 in Canada and 1 in Puerto Rico. This fabulous process of growth has involved all MAPEI's different structures, focusing on the Group's competitive position in its familiar realms of growth: research, innovation and, of course, internationalization.

Forty years after our first steps in Canada, we are a North American market leader in our specialties, employing over 2,000 U.S. and Canadian staff and growing during recent times at a rate of over 20%. The American market is the biggest in the world, and we are continuing to invest in it to meet the constantly growing demand.

MAPEI is totally committed to making the company's powerful presence felt in the most competitive market in the world. As well as investing in manufacturing plants, we continue to be involved in all kinds of other expansion projects, which are extremely important to us, to make MAPEI North America increasingly competitive. I am talking about funds allocated for research & development, marketing, education and strengthening our sales network.

It is worth remembering that the totality of our operations in North America represents one third of MAPEI's overall business around the world. As I see it, the decision to focus on these markets is a winning strategy and will continue to be so for many years to come, since we are operating within the world's most powerful and forceful economy.

This is a challenging market in which highly motivated MAPEI women and men are striving to promote the very best their fields of expertise have to offer. I want to offer special thanks to them and to everybody worldwide who has contributed to this growth in accordance with the Group's corporate philosophy, which is to be global and, at the same time, close to local requirements in every country in which we do business. The courage, hard work and determination of our people have made, and continue to make, our American dream come true.



# AN INTERVIEW WITH NICK DI TEMPORA, 1<sup>ST</sup> MAPEI REPRESENTATIVE IN THE U.S.



**This year MAPEI is celebrating 80 years in business. MAPEI arrived on the North American market in the 1970s, first opening up in Canada and then in the United States. You were part of this business venture. What was it like?**

MAPEI's arrival on the North American market was a real adventure, an exciting discovery of a new world that was a far cry from my own life and my previous experiences. Until I began working with Giorgio Squinzi, I had never even wondered how you install tiles! They were just there and that was that! This business venture gave me the chance to enter unknown

territory and I had to adapt, change my perspective, study all the products and begin from scratch, because nothing I had done in the past was comparable to what I did, experienced and learned at MAPEI.

**What were the most important factors in MAPEI Inc.'s growth in Canada?**

The most important factor in MAPEI's growth and expansion was most definitely... all the Italians in the country. There is a large Italian community in Canada, which is extremely prosperous thanks to its members' proud determination to show people what they can do. Lots of Italians found jobs in the

building industry in Canada. They had to overcome the mistrust of the people who welcomed them but saw them as different and strange. They and their families went through some really hard times, but they managed to integrate perfectly.

These people represent the very best of Italy: They are hard-working and know that you have to be willing to roll up your sleeves and make real sacrifices if you want to overcome people's prejudices. Giorgio Squinzi showed this same spirit of adventure and tenacity when he was invited over to Canada in 1976 by a MAPEI distributor to attend the Montréal Olympics.



MAPEI North America Headquarters,  
Deerfield Beach, Florida



▶▶ **Hard work and determination led to MAPEI's success in North America.**

Together, we have always kept the promises we made to our customers: to provide the best product possible at a competitive price and also the best service possible – in a nutshell, the very best of Italian skill and expertise. The respect and trust of our customers were a direct consequence of our constant effort and determination to improve.

**You are Italo-Canadian. Was it a strategic decision to choose Québec as a starting point rather than another region of the country?**

There was no strategy and no planning in the decision to choose Québec. It just seemed to be the right launch pad for making our dream take off and fly high, powered by determination, hard work and confidence in our own ability.

**For years, you were in charge of the MAPEI Corporation in the United States. What are the most important factors in this subsidiary's growth that is still continuing today?**

MAPEI is growing all the time; and that is the way it should be, because our standards are extremely high and our hard work is the best guarantee we can offer our customers. MAPEI is not just a business, it is a philosophy of life that encompasses everything that once made Italy's history, culture and genius so incomparable. I know I am repeating myself when I say that excellence can only be attained by making sacrifices, working hard, gaining people's trust and showing bravery and plenty of

MAPEI plant in Laval, Québec



**ABOVE** Opening ceremony for new Laval plant in 1984.

**BELOW** Nick Di Tempora and Giorgio Squinzi look at site for Arizona plant in 1983.

heart. That is why MAPEI has always been seriously involved in social projects. All this is part of a world vision that involves investment in the community. Growing also means helping others grow, drawing on your own resources for the common good. Solidarity is a key value that is only too familiar to Italian immigrants. It is based in their deep sense of belonging to their own community and the Italian spirit.

Expanding into the United States was more difficult than in Canada. MAPEI had to make a name for itself in a much bigger market. In the beginning, we only operated in Arizona, but then things changed when we acquired L&M, North American Adhesives and the West Chicago plant in 1996. Our strategy was to grow through acquisition. Results prove that we took the right approach.

**Your role is different nowadays: You are now the honorary chairman of MAPEI Corporation and also in charge of real estate development. Why is property so strategic to the business?**

MAPEI manufactures “heavy” products, so it is important to have regional facilities for manufacturing. Our strategy was to grow organically through additional sales and to also grow by acquiring existing manufacturing facilities; so my aim was, first and foremost, to find good acquisitions. Real estate is simply a consequence of our growth over the years.

**For some years now you have been in charge of Polyglass USA. What do you think of Polyglass operations in North America?**

Polyglass is another successful MAPEI project that is part of our growth strategy through acquisitions. Initial investment in modernizing the plants, adapting the sales strategies and developing new products provided the input for interesting structural growth, which was also helped along by excellent management work. Another challenge was successfully overcome and is further visible proof of a winning approach in North America.



**What were and what are the factors that contributed – and still contribute – to the growth of Polyglass in the United States?**

The constant and, hopefully, unstoppable growth of Polyglass is something MAPEI is extremely proud of: The quality of the products and sales/marketing strategies are, and remain, a magical, winning formula. MAPEI means integration, cooperation and synergistic growth: The team is the same and if one person wins, we all win. We must constantly strive to do better. If we want to call this being competitive, then healthy competition is welcome. Italian people living outside their home country have always had to work doubly hard to prove just half of what they are capable of, but we are always focused on achieving excellence: That is our ultimate target. It is an immense pleasure to work with both Polyglass and MAPEI and achieve increasingly rewarding results.



# OVERCOMING THE CHALLENGE OF 3 HURRICANES

The MAPEI spirit pervades all aspects of the company's path toward success. While 2017 has been a remarkable year in terms of sales, growth and expansion, MAPEI has also had to overcome some exceptionally large environmental obstacles this year.

On August 26, Hurricane Harvey deluged Houston and much of the coastline of Texas with rainfall and floods that lasted for the longest period in recorded history. The resulting damage put many petrochemical companies out of business temporarily and some permanently, leading to shortages of raw materials for many manufacturers in the chemical industry, including MAPEI. The company's logistics and operations managers worked with trucking shortages due to rerouting of vehicles to carry supplies to Texas. They also dealt with rationing of raw material resources to make sure that no MAPEI customers were without their necessary shipments.

The aftermath of Hurricane Harvey was still winding down when Hurricane Irma ravaged the Caribbean Islands and on September 10 mowed a path across South Florida and straight up the eastern side of the state, leaving millions of people without electricity and water. Thanks to superior planning by Florida's emergency management departments, almost everyone was back in good shape within a week. While the MAPEI Fort Lauderdale plant was without electricity for several days, MAPEI's Customer Service personnel re-routed all orders to the nearest MAPEI production facilities, and customers received their shipments without mishap.

And, even this wasn't enough destruction for Mother Nature. Much of the Caribbean had been severely affected by Hurricane Irma, but that did not stop Hurricane Maria from adding to the devastation as it swept through the area almost on the heels of Irma. On September 20, this

Category 4 hurricane smashed into Puerto Rico, knocking out all electricity and most of the island's communications. On the MAPEI home front, the Human Resources Department employees worked tirelessly to contact all MAPEI employees in Puerto Rico, where the company has had a plant since 1993. Finding out that all our employees and their families were safe, Nick Di Tempora immediately set about establishing a relief fund to help the MAPEI Caribe family to restore their homes and lives. A large generator is being shipped to the Puerto Rico facility to re-establish electricity and get operations back on line; and the Fort Lauderdale plant has been shipping product to customers in the Caribbean to help out in the meantime.

Even with all the environmental chaos, MAPEI overcomes the obstacles, and our American dream is vibrant and alive.



# MAPEI/GRT: GROWING FAST AND STRONG

## Our concrete admixtures subsidiary is expanding its sales, resources and operations

The MAPEI concrete admixtures line was first introduced in 1992 with the development of the first-ever, acrylic-based superplasticizer in Europe. Thanks to technological innovations and the constant development of new products, our concrete admixtures category now offers solutions for a varied range of construction needs, from large-scale projects to residential buildings.

In 1993, General Resource Technology, Inc. (GRT) came on the market in the United States as a regional manufacturer and supplier of concrete admixtures, serving concrete producers in the Midwest. The smaller company grew in its field as MAPEI did in Europe. Then, in 2014, GRT became a member of the MAPEI family. Over the past three years, the GRT subsidiary has been growing fast and strong.

We recently met with Jesse Osborne, the General Manager of MAPEI/GRT and engaged him in a Q&A interview about GRT and its role in the concrete admixtures market today.

### **Q. MAPEI acquired GRT approximately three years ago. How is GRT today different from GRT three years ago?**

**A.** The biggest difference between then and now is geography. We have grown from two regional operations areas in the central U.S. to four geographic areas, and we are adding two new areas in 2018. We are also expanding into Canada.

We are moving quickly to meet the needs of our customers, developing a full line of pre-cast admixtures as well as rounding out the ready-mix admixture product line. We are able to accomplish this work on a fast-track schedule due to the support of the MAPEI Center for Excellence in concrete admixtures, located in Milan, Italy. Global support like this really helps us grow at an accelerated rate.

### **Q. How does GRT interact with MAPEI's Research & Development group?**

**A.** In monthly meetings, GRT discusses projects and priorities with the Center for Excellence in Milan. The group offers GRT help and solutions based on R&D projects that GRT is working on at their lab in Eagan, Minnesota. Soon, there will be a new U.S.-based technical center in Logan Township, New Jersey, where the majority of GRT research will take place.

MAPEI's popular **Dynamon™ SX** is an example of global technology that has been added to the GRT portfolio. [See the product spotlight on *Dynamon SX* following this article.]

### **Q. What is GRT's current go-to-market strategy?**

**A.** GRT specializes in the concrete admixtures category as a part of MAPEI's complete strategy to serve the needs of the construction industry in building and infrastructure.





GRT supplies liquid admixtures directly to concrete producers, while MAPEI's Concrete Restoration Systems [CRS] group sells in the more traditional way through distributors. CRS products are used directly on the jobsite, while concrete admixtures are generally used by the concrete producers before they reach the jobsite.

**Q. What are the logistics involved with delivering MAPEI/GRT concrete admixtures to the jobsite (and what is a typical jobsite)?**

**A.** GRT does not traditionally deliver products to jobsites. Our customers are usually concrete producers for the ready-mix, precast and paving sectors. MAPEI/GRT representatives go to the concrete producer's facility and do test evaluations to determine which products are needed and the right quantities for optimal performance. Bulk tankers then deliver the liquid GRT admixtures to the concrete producers at their factories, where the materials are kept in storage tanks until they are ready to be used.

This production and shipping process is very different from that used for the typical MAPEI CRS products, which are produced and packaged in a powdered form, then sold in bulk to distributors who warehouse the products for local purchase and use. These differences explain in part why GRT has its own specialized sales force, as well as "same-but-different" operation locations that are sometimes housed at, but separate from, MAPEI production facilities.

**Q. How have GRT's human resources expanded/realigned to meet the needs of the subsidiary's growth and expansion?**

**A.** We have increased our sales staff 10% in the past year and will continue at this rate in the short term. We will also be increasing our support staff to handle the increase in sales. These new hires will include customer support and plant operations personnel. We have excellent Technical Services support in the U.S. and from MAPEI Global, and we will enlarge this group in North America as demand for our products and services increases.

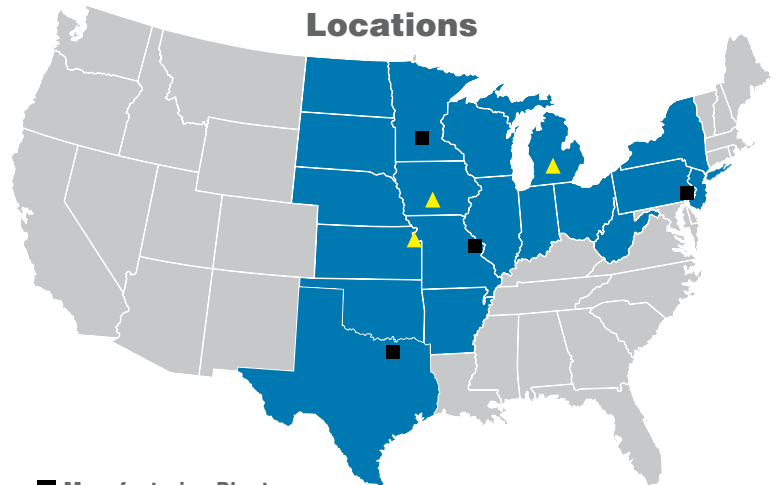
**Q. What is GRT's goal for 2020?**

**A.** In the U.S., our strategic plan includes continuing to increase our footprint by adding more geographical locations and enhancing our national brand recognition. Our current competitors have been ingrained in this country for many years; but we feel that, with MAPEI's global support, GRT will be able to make a solid impact over the next three years.

**Q. What new products, systems or solutions is GRT looking to bring to the market in the next year or two, and why were these products selected for development?**

**A.** Pre-cast concrete producers represent approximately 25% of the admixtures market, while roughly 60% of admixtures are supplied to the ready-mix market; and about 15% of admixtures are supplied to concrete producers for the paving market and other specialties.

The biggest priority for development in the coming year is our special concrete admixtures for the pre-cast sector. Pre-cast concrete is very different from ready-mix concrete, and the two



- **Manufacturing Plants**
  - Eagan, MN (Minneapolis, MN)
  - Madison, IL (St. Louis, MO)
  - Garland, TX
  - Logan Township, NJ (Philadelphia, PA)

- ▲ **Distribution Centers**
  - Lansing, MI
  - Kansas City, KS
  - Grimes, IA (Des Moines, IA)







sectors have distinct needs for their admixtures. Pre-cast is all about speed and efficiency, so these producers want products that react quickly and develop strength quickly. Production time is essential for them.

To secure a significant share in the pre-cast market, GRT intends to offer a complete line of admixtures to meet the requirements of these concrete producers.

**Q. Please tell us about some of the projects that GRT has been involved with over the past year.**

**A.** As you may have seen in a recent issue of *Realtà MAPEI Americas*, GRT concrete admixtures were provided for pre-cast and ready-mix concrete used at the U.S. Bank Stadium in Minneapolis, home of the Minnesota Vikings. [See article in *RMA's Issue 24*, pp. 37-39.]

GRT concrete admixtures were also used for pre-cast and ready-mix work in and around Lambeau Field, the home of the Green Bay Packers, including the Titledown District destination adjacent to the stadium.

Large-scale windmill projects nationwide have been benefiting from GRT concrete admixtures supplied to ready-mix concrete producers. Participating in a small but important way in sustainable energy projects is an accomplishment that MAPEI/GRT is quite proud of.

Highway infrastructure in the central United States is a construction sector where GRT concrete admixtures for paving have played an increasing role too.

**Q. How does GRT participate in MAPEI's sustainability programs?**

**A.** GRT is working on ISO 14001 Environmental Management Systems [EMS] certification in line with MAPEI Group's worldwide commitment to sustainability in our operating plants. This program involves our people, processes and products.

**Q. What has been your biggest challenge/success as the General Manager of GRT?**

**A.** The biggest challenge, as with most operations these days, is recruiting established salespeople in various regions where we are expanding geographically. Our goal is to place quality people with experience and expertise in our field and specific to the region. We have recently added some excellent representation in North Carolina in the Eastern Region.

The biggest success, I believe, has come from realigning the sales force in existing regions for optimal coverage, as well as streamlining the sales process from the corporate office down to individual salespeople. The MAPEI Marketing Department has supported us with a comprehensive plan for addressing our literature and sales support needs, and we now have a presence at all major trade shows in the country. Following our company's vision of working "faster, further, together," we have been collaborating with other MAPEI subsidiaries like our Underground Technology Team. This teamwork allows us to develop synergies that increase opportunities for brand recognition and build our presence in North America.





# SUPERPLASTICIZERS: PAST, PRESENT AND FUTURE

Concrete is a mixture of water, cement, sand and rocks. Correct? Well, it's actually not that simple. In fact, for many years chemical and mineral additions have played an irreplaceable role in concrete technology. Not only have these chemical and mineral additions become an economical benefit to concrete admixtures, but the evolution of concrete technology has also become more closely related – even chemically bonded – to the use of these additions. In particular, the history of superplasticizers goes hand in hand with the development of higher-performance designs for concrete structures.

The development of superplasticizers began in the United States in the 1930s. This development occurred as a result of the accidental discovery that concrete containing a dispersant based on naphthalenesulfonate condensed with formaldehyde was found to have strengths higher than those that are found in untreated concrete. The dispersant, which was used to obtain a better homogeneous coloration, was offering much more than its original intended benefit.

It soon became clear that the dispersant was giving a higher fluidity to the concrete mix. Even more interesting, the dispersant was creating a fluid concrete with only a little mixing water. A better control of the water-to-cement ratio was the key to obtaining excellent mechanical properties. The concrete was more workable and easier to cast. Thus, the first superplasticizers were born.

In the '60s and '70s, the synthesis of naphthalenesulfonate was modified in Japan; in Germany, a superplasticizer that is based on melamine was created. Meanwhile, Italy developed the concept of "rheoplastic concrete," which is characterized by high fluidity and not being subject to segregation. These two traits exist due to the use of high dosages of naphthalenesulfonate-based superplasticizers.

Soon there was another revolution. In the '80s, superplasticizers became the essential components of fluid and superfluid concrete. The study of the mechanisms of action of the superplasticizers led, at that point, to the development of new molecules featuring even better dispersing properties. Unfortunately these superplasticizers, in addition to being expensive, were causing excessive inclusion of air bubbles in the concrete that resulted in poor strengths and other detrimental effects.

In 1992, MAPEI's laboratories developed a new monomer by using polyethylene glycol ethers – materials that until then were exclusively used in niche sectors, such as detergents and cosmetics. This monomer became the fundamental ingredient of a new superplasticizer with low air entrainment that finally enabled concrete producers to manufacture concrete featuring excellent workability retention combined with regular strength development.

Maintaining concrete workability was previously possible only through the addition of substances (e.g., lignosulfonates and



gluconates) that hindered the cement hydration, which slowed down the concrete hardening. Moreover, the new monomer was much more effective than naphthalenesulfonate and could be used in much lower dosages or, alternatively, could achieve a much higher performance in terms of water-reduction ability.

Today's research has brought a high diversification of product offerings to the superplasticizer market. The synthesis of new reactive polymers resulted in "smart superplasticizers" that are able to modify their chemical structure based on the concrete environment and develop functionalities over time. These superplasticizers represent the current efforts of researchers and developers all over the world.

Some new polymers can promote the cement hydration process without decreasing the concrete's workability. Other new polymers can activate over time in a progressive fashion, making up for the natural reduction of consistency in fresh concrete without the use of traditional retarders. All of these polymer properties are being combined in additional components to create viscosity-modifying agents and accurately developed defoaming packages. These admixtures provide the opportunity for production of high-performance concrete mixes with specific behaviors, such as accelerated hardening, self-consolidating rheology and long retention of workability.

The future is focused on research into a consolidation of the most advanced superplasticizer technologies that use fewer non-renewable resources, with the final aim of building much more durable buildings, bridges and other structures.



**About the author:**  
Claudio Genoria

Claudio is the Key Account Manager at MAPEI/GRT, providing technical support and advocacy for major customers. Claudio's background is as a geologist, and he has 19 years of experience in the industry. He formerly worked for Salini Impregilo as a tunneling-site geologist and for General Beton Triveneta, an Italian ready-mix international group, as a technical manager. Claudio has worked for MAPEI for nine years – first as a business developer in the concrete admixtures product line for the company's subsidiaries in Europe, and now for MAPEI/GRT in North America.



## Dynamon™ SX

### High-Range Water-Reducing Admixture

*Dynamon SX*, a high-performance, water-reducing admixture for concrete, is based on polycarboxylate technology and belongs to MAPEI's *Dynamon* system. *Dynamon SX* meets the requirements of ASTM C494 Type F and AASHTO M194 Type F.

*Dynamon SX* can be used when concrete requires a high level of workability and excellent mechanical properties when hardened.

#### Uses

*Dynamon SX* has been designed for use in ready-mix and precast/pre-stress applications and where there is the need for greater water reduction, along with high mechanical strength at all ages. Its performance makes it particularly suitable for manufacturing self-consolidating concrete (SCC). *Dynamon SX* ensures high workability and cohesiveness in all concrete mixes.

The main application of *Dynamon SX* is the production of:

- Concrete for high mechanical performance with long retention of slump.
- Concrete for durable structures.
- Concrete with mid- or high-strength performance.
- SCC.

#### Compatibility

*Dynamon SX* is compatible with most products for preparing quality concrete. It is especially compatible with:

- Non-chloride accelerators (from the MAPEI/GRT product line) for reaching high mechanical strengths at early ages.
- Retarders and slump extenders.
- Air-entraining admixtures.
- Viscosity-modifying admixtures.
- Approved MAPEI form-release agents for releasing concrete from formworks.
- Expansive agents and shrinkage-compensating admixtures to produce shrinkage-resistant concrete.
- Curing compounds from the *Mapecure*™ product line to protect against rapid water evaporation.
- Silica-fume-based powder additions.
- Class C and Class F fly ash.
- Various types of limestone fillers for manufacturing SCC and any other type of concrete that requires these fillers.
- All types of Portland cements.



### Product Performance Properties

Laboratory Tests	Results
Consistency	Liquid
Color	Amber
Primary function	Increases workability and/or reduction of mixing water
Density	8.93 lbs. per U.S. gal. (1,07 kg per L)
ASTM C494 classification	Type F
AASHTO M194 classification	Type F
Corrosivity	Non-corrosive. <i>Dynamon SX</i> does not contain calcium chloride or other chloride-based components. Its use will not contribute to the increased corrosion of reinforcing steel in concrete.

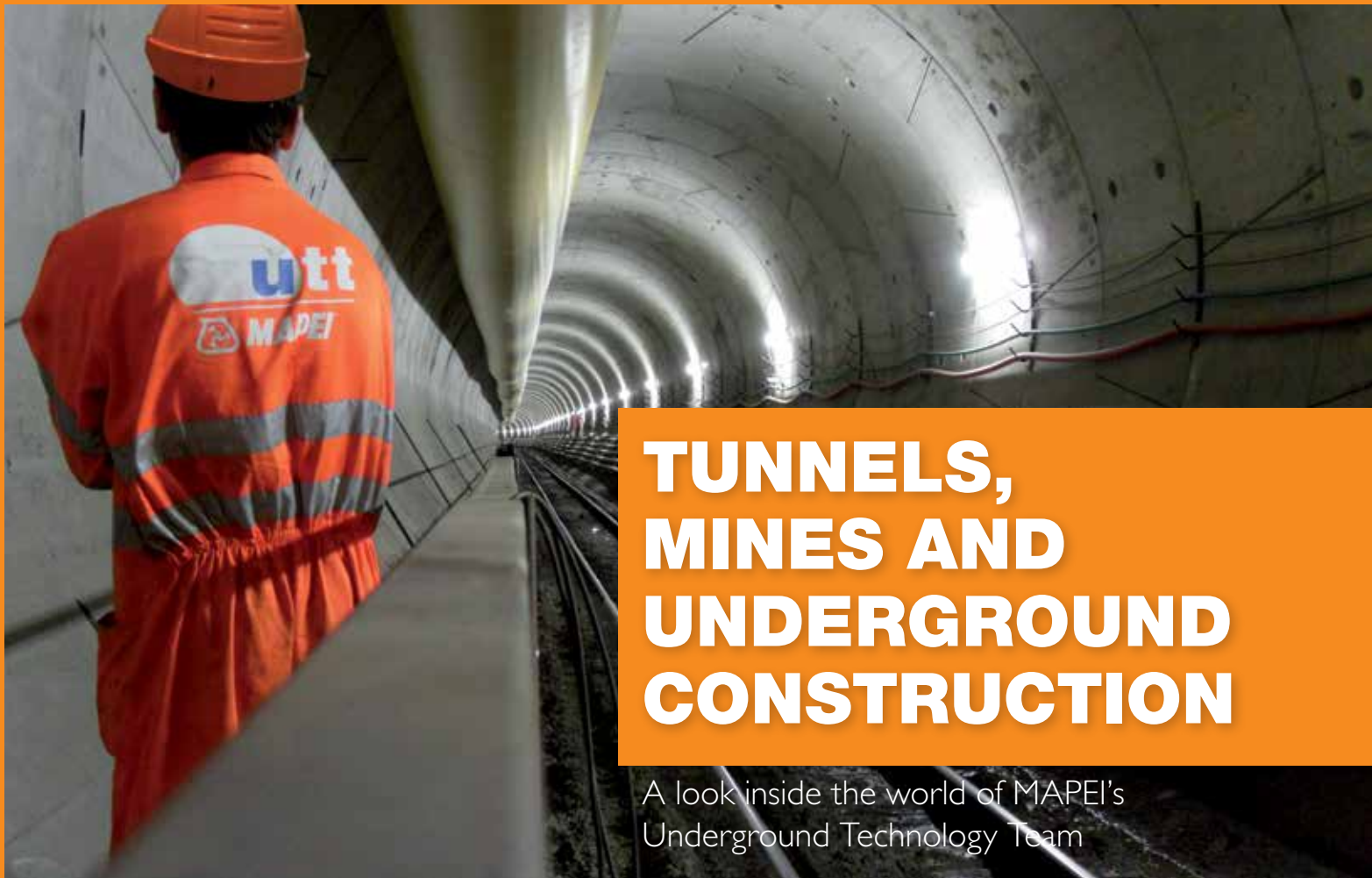
#### Packaging

*Dynamon SX* is available by bulk delivery, drums measuring 55 U.S. gals. (208 L) and totes measuring 275 U.S. gals. (1 041 L).

#### Storage

*Dynamon SX* can be stored for 1 year in sealed containers at between 41°F and 95°F (5°C and 35°C). Protect from freezing. Exposure to direct sunlight can cause slight color variations without altering the performance of the product in any way.





# TUNNELS, MINES AND UNDERGROUND CONSTRUCTION

A look inside the world of MAPEI's  
Underground Technology Team

MAPEI has a global track record of more than 80 years spent solving problems for the construction industry. And for nearly two decades, MAPEI's Underground Technology Team (UTT) has developed solutions for the many complex ground-control challenges and conditions facing the underground construction, tunneling and mining projects around the world.

UTT Technical Assistance, which is key to MAPEI's success in the field, provides:

- Sound technical skills aligned with deep knowledge of products, mining methods and methodology, production phases and maintenance processes.
- Technical and consulting assistance in order to focus on the correct products and technical solutions.
- Round-the-clock global intervention, 24 hours per day, 365 days per year.
- Customer-focused solutions tailored to help reduce costs, improve mining production and enhance miner safety.

## Tunneling

When contractors are working on a building or a road, they can see what they are building and anticipate any problems. Going into a tunnel is a different matter altogether, because underground conditions are unknown until the excavation is in process. Therefore, it is important to contractors to have immediate access to specialists who can help them solve any issues that suddenly arise. That's where MAPEI comes in.

Globally, the UTT offers a comprehensive menu of underground solutions in several areas:

- Shotcrete technology
- Mechanized tunneling products (complete tunnel-boring machine solutions)
- Drilling and ground consolidation products
- Injection systems
- Waterproofing systems (synthetic membrane and chemical technologies)
- Pavement products
- Tunnel maintenance, rehabilitation and coating products

A brief look at tunnel-boring machine solutions illustrates the complexity of this type of construction. Mechanized tunneling is conducted by a tunnel boring machine (TBM), which bores out a whole section of tunnel in a single continuous operation. As the machine advances, the annular gap between the outside diameter of the TBM's shield and the outer face of the blocks used to line the tunnel needs to be filled while tunneling operations are being carried out.

Recently, mechanized tunneling designers and contractors have chosen the so-called "two-component" backfilling system more and more frequently. This system comprises:

- Component A, a highly fluid, easy-to-pump cementitious slurry, whose stability and impermeability is increased thanks to the use of bentonite. To guarantee the slurry workability up to 72 hours from mixing, a liquid retarding admixture with a plasticizing effect is added, such as MAPEI's **Mapequick CBS System 1**.
- Component B, a liquid activator admixture, such as MAPEI's



**Mapequick CBS System 2**, which is added to Component A just before it is injected into the annular gaps that need to be filled. This admixture is an efficient neutralizer of the set-retarding action of *Mapequick CBS System 1* and turns the mixture into a gel almost immediately, in a time that can also be modulated (from 5 to 25 seconds).

There are some important advantages of this system as compared with other materials. Its super-fluid consistency and maintenance of workability reduce the risk of clogging in the transport lines and pumping hoses. Its capacity to completely fill the annular gap behind the ring minimizes any movement in the ground and, as a result, the risk of collapse during tunneling.

The system also hardens very quickly so that, even if water is present, its initial mechanical strength also develops very quickly, thereby “blocking” the tunnel ring in its specified position. The progressive hardening of the system is due to its passing rapidly from a liquid state to a gel-like state, which also helps to reduce ingress of the injected material into the area being excavated by the TBM. The special characteristic of the *Mapequick CBS* system is that it guarantees a rapid change in state from liquid to gel to solid, which allows the annular gaps to be completely filled while preventing, in the case of water being present (a common occurrence when excavating underground), leaching and weakening of the mix.

The composition of the backfilling mix injected behind the concrete segments must be designed to meet the specified performance characteristics while also being cost-effective. Each project has its own particular set of problems; and, therefore, it is important that the two-component mix is designed according to the specific requirements of each jobsite and monitored for performance.

After the UTT has taken into consideration all the specific requirements of the jobsite, preliminary tests are carried out at MAPEI’s research & development laboratories in Deerfield Beach, Florida (for the North American market). Once the mix had been designed and tested in the lab, the Technical Services Department of MAPEI’s UTT tests and checks the mix on site during the first few weeks of TBM operations, and then every week during the TBM’s round-the-clock work regimen. The purpose of the continuous checks is to determine that the results achieved on site are comparable to those obtained during the lab tests and, if necessary, to intervene to bring the material in line with project specifications.

The use of MAPEI’s high-tech UTT products can be illustrated through recent underground projects in which they were adopted, including:

- Farringdon Station, part of the Crossrail project in London, where the tunnel surfaces were waterproofed using **Mapeplan TU S**, **Mapeplan Waterstop**, **Idrostop Multi** and **Mapeplan Anchoring**.

- The Ejpovice Tunnel in the Czech Republic, for which *Mapequick CBS System 1*, *Mapequick CBS System 2*, **Polyfoamer FP/CC** and other products were employed during construction work.
- The work carried out in Belchen, Switzerland. **Mapeblox PKG**, **Mapeblox BT**, *Mapequick CBS System 1* and **Mapequick CBS System 3** all played a key role to automate the third tube of the Belchen tunnel along the A2 motorway. **MapePUR Universal Foam G**, **Mapefix EP 385/585** and **Mapegrout Thixotropic** were also used for this project.
- The Anacostia River Tunnel, in Washington, D.C., where *Mapequick CBS System 1* and *Mapequick CBS System 2* helped to deliver the cementitious grout to the tunnel and allowed it to set quickly once in place. **Mapebent CBS 5** and *Polyfoamer FP/CC* were also used on this project (see details on the Anacostia River Tunnel in the project reference following this article).
- The Ottawa Combined Sewage Storage Tunnel in Ontario, Canada, where **Mapebent CBS 5** was used with the annulus grout, and **Mapeblox T**, **Mapeblox EP2** and **Mapeblox PKG** were used to facilitate the operation of the TBM.





## Mining and other underground construction

MAPEI mining solutions have been developed over time to meet the needs of this huge global market. These solutions improve productivity, reduce overall costs, and enhance safety for the mine operators as well as for the mining contractors who specialize in serving their needs.

Top-tier products and technologies have been developed by the UTT group to solve common challenges in mining. The UTT designs solutions that completely satisfy all the technical requirements of clients who serve the mining industry in North America (and on a global scale).

For the needs of the mining customer working with **shotcrete and concrete for ground support**, MAPEI offers a complete range of proven technology, including:

- o High-performance, flash-setting, alkali-free accelerators.
- o Admixtures for shotcrete (mix base) and concrete.
- o Admixtures for roller-compacted concrete (RCC).
- o Stabilizers.
- o Air-entraining agents.
- o Viscosity-modifying agents.
- o Accelerators/anti-freeze agents.
- o Curing agents.
- o Admixtures for lightweight concrete.
- o Pumping aids.

In the area of **injection systems, consolidation and anchoring**, a full range of ready-to-use cementitious mixes, chemical grouts and chemical resins is available for injection into rock, soil or concrete structures. Designed to improve ground control, control water ingress, stabilize soils and improve anchoring, these products include:

- o Single- and dual-component polyurethane resins for ground consolidation, water-stopping, and soil stabilization.
- o Dual-component polyurea silicate resins for ground stabilization and polyurea silicate void-filling foams.
- o Environmentally friendly mineral grouts for soil stabilization and final injection to create ultra-dry results in water mitigation challenges.
- o A full range of admixture solutions to improve and optimize ordinary Portland cement (OPC) grouts.
- o Chemical and cementitious solutions for anchoring applications.
- o Acrylic (acrylate) grout solutions for mitigating and stopping nuisance water conditions, soil stabilization and permanent water protection around underground infrastructure.

MAPEI's UTT also offers products for renovation, maintenance, repair and waterproofing activities, plus equipment for ready-to-use shotcrete and injected products:

- o Dry-mix, prepackaged shotcrete for dry or damp spray techniques

- o Fireproof mortars
- o High-performance repair mortars, grouts and coatings
- o Thixotropic grouts and repair solutions

MAPEI people make the difference. We focus on the needs of the mining industry with the combined experience of the UTT and its dedication to solving common and uncommon challenges underground. We support our mining customers where they work underground, in the mines, laboring side by side until the project is completed or the application meets our clients' satisfaction.

The UTT products for the mining industry are supported by the UTT, which offers:

- Technical consulting, support and assistance at the mine site.
- Laboratory testing and support to meet specific application challenges.
- The development and optimization of formulations for various system solutions.
- Product classification, certification and approvals for the mining industry.
- Personalized, practical site-based client training as needed.

Research and product innovation have become a normal part of the everyday culture of MAPEI and the UTT. A considerable portion of MAPEI's annual revenue is reinvested in important R&D projects, allowing us to maintain our leadership position around the globe.





# MAPEI'S UNDERGROUND TECHNOLOGY TEAM JOINS A TUNNEL DIG

Anacostia River Tunnel  
– Washington, D.C., USA

**Overview:** MAPEI products from the Underground Technology Team (UTT) line were used to help the tunnel boring machine “Nannie” dig a tunnel 2.37 miles (3,81 km) in length that extends from Robert F. Kennedy Stadium in northeast D.C. to Poplar Point in southeast D.C. The *Mapequick CBS System 1* and *System 2* products helped deliver the cementitious grout to the tunnel and allowed it to set quickly once in place.

The Anacostia River Tunnel project (ART) is the second in a series of four tunnels that comprise the DC Water’s Clean Rivers Project, which is intended to reduce the ongoing pollution of the Potomac and Anacostia rivers.

The project will help to alleviate combined sewer overflows that are currently discharged to the Anacostia River after heavy storms.

The Anacostia River Tunnel is 23 feet (7,01 m) in diameter, is approximately 12,500 feet (3 810 m) in length and extends from Robert F. Kennedy (RFK) Stadium in northeast D.C. to Poplar Point in southeast D.C.

In addition to the tunnel construction, the District of Columbia Water and Sewer Authority has been building surface facilities to divert the combined sewer overflows to the tunnel at various sites along the I-295 corridor, M Street SE and the Southeast Freeway. These facilities include deep shafts that range from 20 to 60 feet (6,10 to 18,3 m) wide and large concrete structures to divert raw sewage from being discharged to the Anacostia River during times of heavy storm runoff.

The construction of these facilities is the largest project of its kind since the construction of the original D.C. sewer system in the early 1900s.



The Anacostia River Tunnel will connect with the Blue Plains Tunnel at Poplar Point and deliver captured combined sewer overflows to the Blue Plains Advanced Wastewater Treatment Plant for treatment prior to discharge to the Potomac River. Upon completion of this first phase of the DC Water's Clean Rivers Project in March 2018, combined sewer overflows to the Anacostia River will be reduced by 81 percent. A critical piece of equipment for the project was the tunnel boring machine (TBM) Nannie, named after Nannie Helen Burroughs, an African-American educator and civil rights activist in D.C. The TMB began mining the tunnel on October 19, 2015, and completed the job on November 5, 2016, slightly more than one year later.

## MAPEI at work on the jobsite

As the TBM Nannie bored through the earth, it dispersed an annulus grout – the cementitious grout that is placed between the concrete segmental liner and the ground. The grout fills this gap and holds the concrete liner in place. The grout needs to be pumped for long distances and exhibit good stability. Therefore, the workers on site used **Mapebent CBS 5**, a sodium bentonite mixture, to keep the grout from segregating and setting too quickly,

as well as **Mapequick CBS System 1**, which allowed the grout to be pumped for long distances without setting. Once the grout reached the point of placement, it needed to set quickly. The sodium silicate **Mapequick CBS System 2** was used to produce a rapid set, typically in 5 to 10 seconds.

The ground that is being mined is often treated as it is being excavated in order to facilitate the extraction and removal of the spoils (soil, dirt and rubble). For the ART project, MAPEI provided **Polyfoamer FP/CC**, which is foamed before being injected into the ground. It works to reduce the stickiness of the clay that the tunnel boring machine passed through and to provide body to the coarse sands and silts.

Members of MAPEI's UTT group were on hand to consult with the project engineers and workers and to ensure that the dosage of the MAPEI products was optimal for the ART project. Nannie bored 100 feet (30,5 m) underground, passing under the Anacostia River, CSX railroad tracks, and the Green Line of the Washington, D.C. subway system. MAPEI products were part of the project all the way.

## TECHNICAL DATA

**Anacostia River Tunnel** – Washington, D.C. (USA)

**Period of construction:** 2015-2016

**Years of MAPEI involvement:** 2015-2016

**Where MAPEI products were used:** MAPEI's Underground Technology Team products were used to help deliver the cementitious grout to the tunnel and allowed it to set quickly once in place. **Mapebent CBS 5** and **Mapequick CBS System 1** were used to keep the grout from segregating and setting too quickly while being pumped for long distances. **Mapequick CBS System 2** was used to produce a rapid set, typically in 5 to 10 seconds. **Polyfoamer FP/CC** helped to reduce the stickiness of the clay that the tunnel boring machine passed through.

**Project owner:** District of Columbia Water & Sewer Authority

**Project manager:** Daniele Nebbia

**General contractor:** Impregilo/Healy/Parsons Joint Venture

**Designer:** Impregilo/Healy/Parsons Joint Venture

**MAPEI coordinators:** Wesley Morrison, Monica Rourke

### MAPEI Products

Keeping the grout from segregation and premature setting: **Mapebent CBS 5** and **Mapequick CBS System 1**

Quick set of the grout: **Mapequick CBS System 2**

Ground conditioning and lubrication: **Polyfoamer FP/CC**



Hebron gravity-based structure  
– Bull Arm, NL, Canada



# PROTECTING OIL-PRODUCTION STRUCTURE AGAINST WEAR

**Overview:** For the Hebron oil field's gravity-based structure (GBS), MAPEI's *Mapecoat CFS* and *Mapeprimer M* were used as a curing compound and for concrete protection in interior and exterior areas that would be in contact with harsh environmental conditions.

The Hebron oil field is located in the Jeanne d'Arc Basin of the North Atlantic Ocean, 217 miles (350 km) southeast of St. John's, Newfoundland. Discovered in 1980, the field will produce an estimated total of more than 700 million barrels of recoverable resources. Located within the field is the Hebron gravity-based structure (GBS), which will pump 150,000 barrels of heavy oil a day.

According to the owners, the structure "consists of a reinforced concrete structure designed to withstand sea ice, icebergs and meteorological and oceanographic conditions. It is designed to store approximately 1.2 million barrels of crude oil." The majority of the work on the GBS took place at the Bull Arm fabrication site in Trinity Bay, Newfoundland, with 3,500 workers on site during the construction.

The Hebron GBS project has delivered significant benefits to Newfoundland and Labrador, including employment and training

of a diverse workforce, research and development opportunities, and fabrication and construction work, along with significant royalty and tax revenues.

## MAPEI products on the jobsite

After being accepted as an approved supplier for the Hebron GBS project, MAPEI worked with distributor Apex Construction Specialties Inc. to provide a concrete-curing system with a protective coating for the GBS.

As part of a concrete slip-forming application (a construction technique in which concrete is continuously poured into a moving form to allow for simultaneous extrusion and finishing of the concrete), Kiewit-Kvaerner Contractors (KKC) employees applied *Mapeprimer M* over fresh concrete. After waiting an hour, they applied *Mapecoat CFS* with a notched trowel and then flattened it. *Mapecoat CFS* is thixotropic and easy to apply, even in thick layers, on both horizontal and vertical surfaces.

*Mapecoat CFS* was applied in two coats at about 1/8" (3 mm) of total thickness. After curing, *Mapecoat CFS* formed a flexible and robust coating that acted as a curing compound and protection for the concrete in areas that will be in contact with crude oil while the structure is in operation.

Operating in 12-hour shifts, the workers applied about 926 lbs. (420 kg) of *Mapecoat CFS* and 50 units of *Mapeprimer M* a day. At times, they would slip-form for four weeks nonstop on certain applications. **Mapenet 150**, a reinforcing mesh, was used where needed with the *Mapecoat CFS*.

In 2016, KKC employees also coated the interior shaft of the structure with *Mapecoat CFS* and *Mapeprimer M*. The diameter of the shaft is 115 feet (35 m) in width.

The Hebron GBS was scheduled to begin its oil production in the fourth quarter of 2017.



## TECHNICAL DATA

**Hebron gravity-based structure** – Bull Arm, NL, Canada

**Period of construction:** 2013-2016

**Years of MAPEI involvement:** 2013-2016

**Where MAPEI products were used:** MAPEI's structural-strengthening products were used to protect the interior and exterior areas against harsh environmental conditions.

**Clients:** Exxon Mobil, Chevron, Suncor, Statoil, Nalcor Energy

**Project manager:** Kiewit-Kvaerner Contractors (KKC)

**General contractor:** KKC

**CRS installer:** KKC

**Engineers:** Amec Foster Wheeler, Stantec

**MAPEI distributor:** Apex Construction Specialties Inc.

**MAPEI coordinator:** Paul Andre Babin

### MAPEI Products

Curing compound and concrete protectant: *Mapeprimer M*, *Mapecoat CFS*

Protective waterproofing mesh: *Mapenet 150*



# PARTNERING FOR MARINE PRODUCTS INNOVATION

MAPEI collaborates with shipbuilding company Fincantieri

MAPEI, a leading manufacturer of chemical products for the construction industry, and a company that has a well-developed line of products for the shipbuilding industry, recently signed a strategic cooperation agreement with Fincantieri, a world leader in cruise ship construction. The two companies will collaborate in the field of research and innovation.

Fincantieri is one of the world's largest shipbuilding groups and a leader in diversification and innovation. A leader in cruise ship design and construction, it is recognized as a benchmark company in all high-tech shipbuilding industry sectors – from naval to offshore vessels, from high-complexity special vessels and ferries to mega-yachts, ship repairs and conversions, systems and components production and after-sales services.

Headquartered in Trieste, Italy, Fincantieri has built more than 7,000 vessels in over 230 years of maritime history. With almost 19,200 employees (of whom more than 7,900 work in Italy) and 20 shipyards on 4 continents, today Fincantieri is the leading Western shipbuilder. It has among its clients the major cruise operators, including those of the Carnival Group – Costa, Carnival, Princess, P&O, Holland America and

Seabourn. Fincantieri also builds ships for the Italian Navy and the U.S. Navy, in addition to several foreign navies. Plus, it is a partner of some of the main European defense companies involved in multinational programs.

This partnership will help Fincantieri optimize installation times when its ships are in the building yard or in dry dock for upgrades. Working with MAPEI will also enable Fincantieri to reduce the weight of certain materials, improve acoustic insulation by using specific products, and develop and extend the use of adhesives in some shipbuilding applications. Moreover, MAPEI plans to carry out R&D projects for marine industry systems that can also be useful in its traditional operational fields of commercial and residential flooring and building construction.

Collaborative research issues will involve the development of innovative products for a wide range of solutions, including adhesives, underfloor structures, surface materials (technical and finishing), grouts, supporting wall panels, detergents for the cleaning of furnished areas, and materials and protection systems for furnished areas, in addition to thermal, acoustic and mechanical insulation.

In the startup phase of the collaboration, development activities will concern a number of materials and resins for innovative and high-quality finishes, products for waterproofing of wet areas, and textiles having high sound-absorption characteristics.

Furthermore, the agreement between MAPEI and Fincantieri will encourage joint and collaborative training activities, with the aim of improving the innovative capacity in terms of products and process.

Giuseppe Bono, CEO of Fincantieri, stated, "The cooperation with MAPEI, a worldwide leader in its market segment, is wholly consistent with our strategy of increasing the final added value of the product we provide. We are pleased to work with partners like MAPEI, who share our same commitment to innovation, helping us to develop new ideas and projects in specific fields." Bono concluded, "Fincantieri is essentially a big lab – along with the design, executive and organizational skills, we nurture the spirit of research, working to meet the demands of our clients and always asking for a high level of excellence."

MAPEI has always placed great emphasis on research. In fact, MAPEI Group invests



## An example of MAPEI at work on a cruise ship

### Marble and granite installed on cruise line's flagship Ruby Princess

The Ruby Princess is a luxurious floating palace and a jewel of elegance and innovation. She is the flagship liner of the Princess Cruises fleet, a company that carries more than 1-million passengers every year to an incredible range of destinations all around the globe.

The ocean liner, built in the Fincantieri shipbuilding yards in Monfalcone (Gorizia, Italy), completed its maiden voyage to the Caribbean in 2008. It was a dream cruise for passengers on this liner, which measures a gross weight of 127,868 short tons (116 000 metric tons), is 317 yards long (289,6 m) and 39 yards wide (36 m), and has 18 passenger bridges. Ruby Princess can host more than 4,600 people (3,500 passengers and 1,100 crew members) and reach a top speed of 22.1 knots.

In the usual family tradition of Princess Cruises, the liner offers luxurious comfort and impeccable onboard service. As with its sister liners, Crown and Emerald, the Ruby Princess also has a huge foyer similar to a large piazza, which is overlooked by various bars and restaurants. The elegance of this ship combines perfectly with some of the latest novelties in entertainment – four swimming pools and six hot tubs, the grand Princess Theatre, Gatsby's Casino, the Lotus Spa and Fitness Center, a jogging track and a giant open-air "Movie under the Stars" cinema screen that shows sporting events, concerts and the latest releases from the cinema world. There is even a wedding chapel, so it's not just a coincidence that the successful television series "The Love Boat" was set on one of the company's liners.

### A successful working partnership

In such an elegant and fascinating atmosphere, nothing but luxurious floor- and wall-covering materials could have been used, including marble and granite tiles. The task of installing these exquisite materials on the floors and in the swimming pools was entrusted to Marmi Vrech G. SRL from Cervignano del Friuli (Udine, Italy). The company, considered the leader in this sector, was founded by Giocondo Vrech, a craftsman and stonemason who specializes in marble and granite installations for projects in civil and naval environments.

12% of its company's total workforce and 5% of its revenues in R&D. Giorgio Squinzi, Managing Director of Mapei S.p.A. and CEO of MAPEI Group, declared, "The agreement we have signed with Fincantieri represents an important starting point for MAPEI's R&D activities in the marine industry sector. With this collaboration, the sharing of information and expertise will be crucial to making MAPEI a major player in the marine industry market. Our production already includes a line dedicated to this sector; but, thanks to this cooperation with Fincantieri, we can improve it and increase our offer of high-performing products specifically formulated to meet the different needs of the shipbuilding industry."

The benefits of cooperation and R&D collaboration between MAPEI and Fincantieri will continue to improve products for large ships. Two cruise liners in dry dock in the Bahamas just completed upgrades of their interiors using MAPEI products for the marine industry, and we will be reporting on them soon. But for now, enjoy the following story about how MAPEI works hard to meet the specific needs of ocean-going vessels.





A customer of MAPEI for more than 10 years, the company selected products made by MAPEI, the leading company in the adhesives for the ceramics and stone sector, for this high-class liner. More than 30 types of marble and 15 types of granite were installed on board, covering a total of 53,281 square feet (4 950 m<sup>2</sup>) of surfaces and floors, of which 13,293 square feet (1,235 m<sup>2</sup>) alone was laid with granite tessera (mosaic stones) in the bathrooms and around the swimming pools.

The granite and marble were set using **Granirapid**<sup>®</sup> high-performance, deformable, fast-setting and -drying, two-component cement mortar for ceramic tiles and stone. Granite was also installed on lightweight aluminum panels, in this case using **Keralastic**<sup>®</sup> **T**, a high-performance, two-component, thixotropic polyurethane adhesive for ceramic tiles and stone.

The final touch to the coverings was the grouting of the joints with **Ultracolor**<sup>®</sup> **Plus** high-performance, anti-efflorescence, fast-setting and -drying, polymer-modified mortar, which is water-repellent due to DropEffect™ technology and mold-resisting due to BioBlock<sup>®</sup> technology. **Ultracolor Plus** can be used for joints from 2 to 20 mm (5/64" to 3/4") wide.

The working partnership between Marmi Vrech and MAPEI is yet another success story. The project progressed without a hitch and, once again, the installers were perfectly at ease with using the MAPEI products.

## TECHNICAL DATA

**Ruby Princess liner** — built at Fincantieri shipyards in Monfalcone (Gorizia, Italy)

**Designers:** Architects Giacomo Mortola from Studio Gem (Genoa) and Teresa Anderson from Princess Cruises

**Year of construction:** 2008

**Year of MAPEI involvement:** 2008

**Use of MAPEI products:** Supplying products and technical assistance for laying marble and granite coverings

**Clients:** Vitrani (TS), Zago (TV), Ancv (VE), IVN (PD)

**Project managers:** Riccardo Vrech and Giuseppe Stellato

**Tile and stone installation company:** Marmi Vrech G. SRL — Cervignano del Friuli (Udine, Italy)

**Mapei distributor:** Marmi Vrech G. SRL

**Mapei coordinators:** Ivan Carlon and Paolo Alberti, Mapei SpA (Italy)





# MINIMIZING THE IMPACT OF A CHURCH FLOORING INSTALLATION

Holy Trinity Greek Orthodox Church  
– Carmel, IN, USA





**Overview:** MAPEI's surface-preparation products were used to prepare the floor of the Holy Trinity Greek Orthodox Church to receive new tile flooring. *ECO Prim Grip™* was used to cover the polished concrete surface, eliminating the need for shotblasting, which could harm the church's delicate treasures. MAPEI mortars and grouts gave the perfect touch to the new installation.

Holy Trinity Greek Orthodox Church sits on a 20-acre (0,08 km<sup>2</sup>) site in Carmel, Indiana. It was the first Triad Byzantine-design church constructed since Istanbul's Hagia Sophia, which was built more than 1,400 years ago. The Indiana church's design includes a dome – 55 feet (16,8 m) in diameter – that was built and raised up from the ground, bronze doors weighing 600 pounds (272 kg) each at the grand entrance, and the ability to accommodate more than 600 worshippers.

Because the expression of creative beauty within its places of worship is a major tenet of the Greek Orthodox Church, the members of Holy Trinity decided to have the floors and some vertical spaces dressed in tile and stone.

When the church had been built eight years previously, the floors were finished in polished concrete, producing a nonporous, sealed surface that did not offer the proper finish for the installation. Traditional shotblasting could not be used for surface preparation because the method could have harmed the painted frescoes and delicate icons created with a centuries-old process using egg tempera paints.

Innovative technology produced a solution that circumvented traditional surface preparation and helped to provide a breathtaking foundation to anchor the beauty that lines the walls and ceilings of the narthex, nave, sanctuary and ambulatory at Holy Trinity.

## MAPEI products on the jobsite

In a unique solution, the installers from Certified Floorcovering Services (CFS) used **ECO Prim Grip** to cover the polished concrete surface, eliminating the need to shotblast and potentially damage the church's painted treasures. Next, the crew tested and used the new MAPEI self-leveling liquid skimcoat **Ultraplan® LSC** to patch and smooth all floor surfaces, eliminating concerns about resulting dust. They also used **Mapelastic® CI** liquid membrane for crack isolation in the concrete flooring. During the first three weeks of work, the church still held services in the nave.

Once the floors were prepared, CFS installation crews worked meticulously to the architects' plans, transitioning between varied types of porcelain tiles and marble to produce a look that complemented and accented the intricate icons and frescoes. Large-format 24" x 24" (61 x 61 cm) and 12" x 24" (30 x 61 cm) porcelain tiles from Daltile's Diamante, San Michelle and Continental series were set in the narthex, nave and sanctuary using **Ultraflex™ LFT™** mortar and then grouted with **Ultracolor® Plus FA**.

Red Rojo Alicante marble tiles were set as borders and as transitions between the white porcelain tiles. The marble was set with **Kerapoxy® 410** 100%-solids epoxy mortar. This tile was also grouted with **Ultracolor Plus FA** grout. The CFS crews hand-cut many of the Rojo Alicante tiles to fit around existing structures in the church and to tile a number of vertical elevations in the floor. The marble tiles were sealed with **UltraCare Penetrating Plus SB Stone & Porcelain Tile Sealer**.

The installers also set Keystone glass mosaic tiles along the inner walls of the baptistery and interspersed the Glass Horizons mosaic tiles with Crema Marfil marble pillars on the baptistery's exterior. After waterproofing the baptistery with **Mapelastic AquaDefense**, they used **Adesilex™ P10** bright white mortar to set the glass mosaics.



In the narthex and nave, the crews set four pre-fabricated mosaic medallions that continued the iconography from the walls to the floor. They first used **Mapecem® Quickpatch** and **Ultraplan Easy** to patch and level the substrate beneath the medallions. Then the crews set the medallions in place with **Ultraflex LFT**.

**Mapesil™ T** was used to fill all expansion joints and soft joints where vertical and horizontal tiled surfaces met.

When all the tile and marble was set, they were cleaned with a solution of **UltraCare Concentrated Tile & Grout Cleaner**.

In addition to the ceramic, mosaic and marble tile-setting, a small area measuring 50 square feet (4,65 m<sup>2</sup>) in an adjoining section of

the church was covered with Armstrong's Excelon luxury vinyl tile using **Ultrabond ECO® 711**, and the surrounding cove base was set with **Ultrabond ECO 575**.

Innovation and determination bolstered the flooring contractor's efforts to successfully deliver the 12,500 square feet (1 161 m<sup>2</sup>) of flooring to complete the beautification of Holy Trinity Greek Orthodox Church. CFS was so proud of their work that they entered the project in the Starnet Design Awards and took home the Silver Award for the 2017 Unique Installation Challenge.

## TECHNICAL DATA

**Holy Trinity Greek Orthodox Church** — Carmel, IN (USA)

**Architect:** CJK Design Group

**Period of construction:** 2008

**Year of MAPEI involvement:** 2016

**Where MAPEI products were used:** MAPEI products were used to renovate the nave, narthex, sanctuary and ambulatory of the church. Many of the products used in the surface preparation and tile/stone installation were chosen because of their ability to minimize the impact on the church's icons and frescoes.

**Client:** Holy Trinity Greek Orthodox Church

**Project manager:** Brian Estes – Certified Floorcovering Services

**Surface preparation contractor:** Certified Floorcovering Services

**Tile and stone installers:** Certified Floorcovering Services

**Floor-covering installers:** Certified Floorcovering Services

**MAPEI coordinator:** Tyler Barton

### MAPEI Products

Surface preparation products used to prepare the polished concrete substrate: *ECO Prim Grip, Ultraplan LSC, Mapelastec CI, Mapecem Quickpatch, Ultraplan Easy*

Product used for waterproofing the baptistery: *Mapelastec AquaDefense*

Products used to set the tile and stone on the floors, around columns and other vertical services and in the baptistery: *Kerapoxy 410, Ultraflex LFT, Ultracolor Plus FA, Adesilex P10, Mapesil T*

Products used to set luxury vinyl tile and cove base in an adjoining area: *Ultrabond ECO 711, Ultrabond ECO 575*

Products used for cleaning and sealing stone, tile and grout: *UltraCare Penetrating Plus SB Stone & Porcelain Tile Sealer, UltraCare Concentrated Tile & Grout Cleaner*



# HIGH-MOISTURE CONCRETE CAN BE PROBLEMATIC



## Installing flooring over high-moisture concrete has always caused worry

For years a “normal” part of the floor-covering installation process for the resilient, carpet and wood installer was to worry about moisture conditions of the concrete subfloor on which he would work. The issue has received a lot of attention. Hundreds of thousands of words have been written on the topic of concrete moisture. Industry experts have based their entire careers on the subject of concrete moisture and the subsequent disasters it can create if not properly measured and controlled. Businesses have been developed that are exclusively devoted to testing concrete for moisture using accepted industry standards.

The standards normally used to determine moisture content of a concrete slab are ASTM F1869 and F2170. ASTM F1869 is the older of the two test methods and involves the use of a premeasured amount of a desiccant (a substance that attracts moisture such as calcium chloride) that is exposed under a plastic hood affixed to the ground (open) surface of the concrete to be analyzed. The desiccant is exposed to the moisture vapor coming off the concrete slab for three days, after which it is reweighed. The resulting number provides a measurement describing the rate at which moisture is leaving the slab. This measurement is expressed as the moisture vapor emission rate (MVER) and described as the pounds/kilograms of moisture leaving a surface area of 1,000 square feet (92,9 m<sup>2</sup>) over a period of 24 hours.

ASTM F2170, the newer of the two standards, is based on electronic measurement of the relative humidity within the concrete slab itself. The test requires drilling holes into the concrete to a depth of approximately 40% of the entire thickness of the concrete slab.

Probes are placed into the holes and left there to equilibrate for 3 days, at which point readings are taken. The resulting numbers indicate the relative cure state of the concrete slab and are reported as percent relative humidity (% RH). In summary, one ASTM test provides a rate factor for moisture leaving the concrete, while the other reflects a state or condition of the moisture contained within the concrete.

These tests must be interpreted by the flooring professional as to whether the installation system selected will work under those conditions. This is done by comparing the results with the written documentation of the flooring manufacturer or of the manufacturer of the installation adhesive/materials. Traditionally, the flooring professional performs the requisite moisture testing, only to find out the subfloor is not dry enough to receive the designated flooring type. What happens next is usually a discussion with the general contractor about the subfloor not being suitable and either the need to install a moisture mitigation system (which was never planned or budgeted for) or a delay in the project that requires everyone to wait for the concrete to be dry enough to meet the installation's requirements.

The real issue that needs to be clearly understood is, “Why is all this moisture testing relevant?” In other words, why should we care what the moisture content of a concrete slab is at any given time? To answer that, we must look at the system of materials that will come into intimate contact with this substrate and whether those materials will be affected by its moisture content.

In general, three different factors are involved: flooring material, bonding method and subfloor preparation. Let's look at how elevated moisture impacts the use or function of these three factors.

For flooring materials, we generally work with two categories of materials: moisture-sensitive and moisture-insensitive. Moisture-sensitive materials include such flooring types as wood, bamboo, cork, sisal and other natural materials. Moisture-insensitive materials can include ceramic tile or stone, plastic-backed carpet (with vinyl, polyolefin and other proprietary nonporous backings) and most resilient flooring. These materials have varying abilities to handle elevated moisture on their own. Moisture-sensitive flooring products are negatively affected by exposure to moisture and can warp, twist, swell or disintegrate over time. Moisture-insensitive flooring products can be immersed in water with minimal, if any, impact.

The next factor to be considered is the bonding method. Here, we start to see some differentiation in moisture resistance. Generally speaking, most reactive bonding materials (based on urethane or epoxy chemistry) are essentially unaffected by exposure to moisture and elevated pH conditions. Water-based materials (acrylic- or synthetic-rubber-based) have greater sensitivity. Pressure-sensitive bonding methods that require a water-based adhesive to dry completely to the tacky phase are generally more moisture-resistant than “wet-lay” types. Wet-lay water-based adhesives need a dry, porous substrate on which to lose their moisture. Without a dry area for the moisture to wick away, these adhesives will never cure. So, depending on the bonding choice, the flooring contractor may need to pay attention to subfloor moisture conditions.

The last factor for consideration is subfloor preparation. Most concrete subfloors need some form of preparation to fill cracks and depressions or even to create a smooth, level floor. The formulas of normal products used for these fixes are based on cement, fillers and polymers. These products were designed to work on concrete substrates with low to moderate moisture conditions, typically with a maximum level of 8 to 10 lbs. (3,63 to 4,54 kg) of MVER and 90% RH. Once the moisture content rises above those levels, these types of products either won't dry, will soften and deform under load, or will disintegrate into mush. So, before these products can be placed, the normal process would be to install a moisture barrier to protect all of the layers above.

## Today's new methods for installing over high-moisture concrete

The “new normal” starts with subfloor preparation materials that are moisture-resistant and can be installed without regard to concrete moisture levels. MAPEI North America now offers three unique solutions for subfloor preparation that are resistant to high moisture:

- **Planiprep™ MRS** moisture-resistant skimcoat for light surface repairs up to 1/4" (6 mm)
- **Mapecem® Quickpatch** for deep fills up to 3" (7,5 cm) in depth
- **Ultraplan® Extreme 2** for leveling applications up to 1" (2,5 cm) in depth

These three prep solutions can be combined with moisture-resistant adhesives such as **Ultrabond® G15** premium, fast-setting, epoxy flooring adhesive for high-moisture conditions; **Ultrabond ECO® 995** premium moisture-control, sound-reduction and wood-flooring adhesive; and **Ultrabond ECO 985** hybrid-polymer-based, moisture-control and sound-reducing wood-flooring adhesive. The resulting systems create a new normal for flooring installation.

Systems built from this product portfolio can be installed without moisture testing or moisture mitigation systems and are fast becoming the standard approach for floor-covering installation. They are extremely robust and fast, saving hours of time as well as cost for the flooring contractor. And in today's critical environments, where silica dust generation is becoming a huge concern to flooring contractors, it's a major benefit to minimize the mechanical abrasion often needed for the placement of epoxy moisture barriers.

MAPEI is continuing its efforts to produce new and novel solutions for floor-covering installation that allow the installer to disregard the usual time constraints associated with addressing high moisture conditions of a concrete substrate. These solutions will streamline the installation process, permitting the contractor to work in virtually any condition. The traditional methods will always be there and will be fully supported for years to come; but it is the strategic vision of MAPEI to take this industry to the next level. The products mentioned here are the beginning of a very bright and exciting “new normal.”







## System solutions for highly moisture-resistant installation

The following scenarios give some recommended installation system solutions for floor-covering installation at varying levels of moisture emission.

### Example 1: For installing LVP/LVT flooring

Condition #1: < 8 lbs. (< 3.63 kg) MVER and < 95% RH

1. Traditional MAPEI subfloor prep products; **Ultrabond ECO 373**

Condition #2: 8 to 15 lbs. (3.63 to 6.80 kg) MVER and > 95% RH

1. **Planiseal® MSP**; traditional MAPEI subfloor prep products; and MAPEI floor-covering adhesive designed for LVP/LVT

2. *Planiprep MRS*; *Mapecem Quickpatch* or *Ultraplan Extreme 2*; *Planiseal MSP* and MAPEI floor-covering adhesive designed for vinyl flooring and suitable for use on nonporous substrates

Condition #3: > 15 lbs. (6.80 kg) MVER and > 95% RH

1. *Planiprep MRS*; *Ultrabond G15*
2. **Planiseal VS** or **Planiseal VS Fast**; **Primer T™**, **Primer E™** or **Primer WE™** and traditional MAPEI subfloor prep products; and MAPEI floor-covering adhesive designed for vinyl flooring
3. **Planiseal PMB** (with sand broadcast) and traditional MAPEI subfloor prep products; and MAPEI floor-covering adhesive designed for vinyl flooring



### Example 2: For installing wood flooring

Condition #1: < 15 lbs. (6.80 kg) MVER and > 99% RH

1. *Planiseal MSP*; traditional MAPEI subfloor prep products; and traditional-performance MAPEI wood-flooring adhesive
2. *Planiprep MRS*; *Mapecem Quickpatch* or *Ultraplan Extreme 2*; *Planiseal MSP*; and traditional-performance MAPEI wood-flooring adhesive

Condition #2: > 15 lbs. (6.80 kg) MVER and > 95% RH

1. *Planiprep MRS*; *Mapecem Quickpatch* or *Ultraplan Extreme 2*; **Ultrabond ECO 983** (for < 15 lbs. [6.80 kg] MVER and 95% RH only) or *Ultrabond ECO 985* or *Ultrabond ECO 995* (no moisture limits)
2. *Planiseal PMB* (single coat); and traditional-performance MAPEI wood-flooring adhesive
3. *Planiprep MRS*; *Mapecem Quickpatch* or *Ultraplan Extreme 2*; *Planiseal PMB* (single coat); and traditional-performance MAPEI wood-flooring adhesive
4. *Planiseal VS* or *Planiseal VS Fast*; *Primer T* or *Primer E* (with sand) and traditional MAPEI subfloor prep products; and traditional-performance MAPEI wood-flooring adhesive



### Example 3: For installing carpet tiles

Condition #1: < 8 lbs. (< 3,63 kg) MVER and < 90% RH

1. Traditional MAPEI subfloor prep products; and **Ultrabond ECO 810** for < 8 lbs. (3,63 kg) MVER and 90% RH

Condition #2: 8 to 15 lbs. (3,63 to 6,80 kg) MVER and > 95% RH

1. *Planiseal MSP*; traditional MAPEI subfloor prep products; and any MAPEI adhesive designed for carpet tile
2. *Planiprep MRS*; *Mapecem Quickpatch* or *Ultraplan Extreme 2*; *Planiseal MSP*; and any MAPEI adhesive designed for carpet tile

Condition #3: > 15 lbs. (6,80 kg) MVER and > 95% RH

1. *Planiseal VS* or *Planiseal VS Fast*; *Primer T*, *Primer E* or *Primer WE* and traditional MAPEI subfloor prep products; and any MAPEI adhesive designed for carpet tile
2. *Planiseal PMB* (with sand broadcast); traditional MAPEI subfloor prep products; and any MAPEI adhesive designed for carpet tile

For more of the solutions that MAPEI can provide, visit [www.mapei.com](http://www.mapei.com) to see the brochure "Floor-Covering Installation Systems for High-Moisture Concrete Substrates." You can also speak with your MAPEI sales or technical services representative for details on these system solutions and how they can apply to your specific project requirements.



#### About the author:

Jeffrey B. Johnson

Jeff is the Business Manager for MAPEI's Floor Covering Installation Systems line. Jeff brings to the industry more than 25 years' experience in floor-covering installation product development and marketing. Practical experience in the construction industry and as a bench chemist gives Jeff a unique and exciting perspective on surface preparation, moisture mitigation and floor-covering installation.



## Ultrabond® G15

### Premium, Fast-Setting, Epoxy Flooring Adhesive for High-Moisture Conditions

Ultrabond G15 is a fast-setting, two-part reactive epoxy adhesive with low volatile organic compounds (VOCs), designed for the installation of rubber and vinyl flooring in high-moisture conditions. Ultrabond G15 provides the ultimate in bond and shear strength, can be used on concrete slabs with high moisture vapor emission rates, and is recommended for high-traffic installations where superior indentation resistance and performance are required.

When Ultrabond G15 is combined with new Planiprep™ MRS moisture-resistant, high-compressive-strength skimcoating compound, they form a warranted installation system for solid rubber and vinyl flooring that does not require an epoxy moisture barrier.

#### Features and Benefits

- Low perm rating
- Fast-setting and easy to apply
- Unaffected by moisture

#### Uses

- For the installation of solid vinyl sheet, tile and plank; virgin rubber sheet and tile flooring; and VCT
- Interior commercial (office buildings and cafeterias)
- Interior heavy commercial (shopping malls, grocery stores and department stores)
- Interior institutional (hospitals, schools, universities, libraries and government buildings)



#### Product Performance Properties

Laboratory Tests	Results
Solids content	95% to 100%
Flash point for Part A and Part B	> 200°F (93°C)
Perm rate (ASTM E96)	< 0.11 perms
VOCs (Rule #1168 of California's SCAQMD)	8 g per L
VOCs (Section 01350 of California's CDPH)	Passed

#### Shelf Life and Product Characteristics (before mixing)

Shelf life	2 years when stored in original, unopened packaging at 73°F (23°C)
Storage conditions	Store at 65°F to 85°F (18°C to 29°C).

Protect containers from freezing in transit and storage. Provide for heated storage on site and deliver all materials at least 24 hours before work begins.

#### Packaging

Size
Kit: 1 U.S. gal. (3,79 L) Part A: 0.73 U.S. gal. (2,76 L) Part B: 0.27 U.S. gal. (1,02 L)

#### Approximate Coverage\*

Typical Trowel	Coverage
1/32" x 1/16" x 1/32" (1 x 1,5 x 1 mm), U-notch	185 to 245 sq. ft. per U.S. gal. (4,53 to 6,0 m <sup>2</sup> per L)

\*Trowel dimensions are depth/width/space. Coverage shown is for estimating purposes only. Actual jobsite coverage may vary according to substrate conditions, type of trowel used and setting practices.

# CONCRETE RESTORATION AND COLORFUL COATING FOR HOTEL

**Challenge:** A downtown hotel needed a facelift to remain a prominent hospitality destination in Miami. The concrete facade had multiple and complex cracks, as well as some delaminated areas. Working along with the contractor and the engineer, MAPEI supplied a solution that included concrete repair products and a flexible, breathable coating system that was able to bridge cracks and give superior protection to the structure.

## Solution:

### Repairs

The hotel facelift began with repairs to the structure.

Step 1 – The first step involved removing delaminated stucco to expose spalls in the structural concrete. **Mapefer™ 1K**, a corrosion inhibitor, was applied to exposed metal rebar.

Step 2 – A combination of **Planitop® 12 SR** and traditional cementitious stucco was used to repair the facade. **Planitop 12 SR** is fiber-reinforced, contains both silica fume and a corrosion inhibitor, and is excellent for the repair of vertical, overhead and horizontal concrete surfaces.

### Coatings

MAPEI's **Elastocolor®** system was applied as the exterior coating. After the project engineer conducted proper evaluation about the types of cracks and how to address them, multiple mockups were produced to match the color that was required by the property owner. Then a complete coating solution was specified. The coating solution included the following steps:

Step 3 – **Elastocolor Primer WB** was applied to all previously painted surfaces in preparation for the surface coatings. The coverage with the primer was about 400 square feet per U.S. gal. (9,8 m<sup>2</sup> per L).

Step 4 – **Elastocolor Flex** Fine was used for both the stripe coat on the edges of the

repairs and to provide a uniform textured finish over the entire facade. This minimized the visibility of the repairs and provided flexible, crack-bridging protection against further propagation of cracks in the finish. **Elastocolor Flex** Fine was applied at a wet film thickness of 15 mils, with coverage of about 105 square feet per U.S. gal. (2,57 m<sup>2</sup> per L).

Step 5 – **Elastocolor Coat** Smooth was applied at a wet film thickness of 12 mils (dry film thickness of 5 mils) to complete the protective weatherproof coating system.

MAPEI was chosen as the supplier of choice for this project because all products needed for a superior solution were provided from a single source and were supported by MAPEI's sales and technical services.

JW Marriott Downtown Hotel  
- Miami, Florida



Note: For visual clarity, the repairs represented in the graphic rendering are larger than the actual repairs.



# NEW SUSTAINABILITY BROCHURE DETAILS MAPEI'S COMMITMENT

With its people, processes and products, MAPEI is committed to using energy and resources sustainably, minimizing waste, and developing and supplying quality products with user safety in mind. The following information is from MAPEI's new brochure "Sustainability and Transparency," available at [www.mapei.us](http://www.mapei.us).

## Performance and transparency go hand in hand

Whether social, financial or environmental sustainability is being measured, people are integral. At the core of transparent performance is a business whose employees are dedicated to processes and products that are developed without sacrificing the environment, health or high performance.

True sustainability requires the entire company's commitment to transparency, from the selection of raw materials to the jobsite delivery of finished products. Our employee handbook and our Code of Ethics spell out the ways in which our people respond to each point in the process.

When it comes to our products, it all starts in the MAPEI laboratories. As part of MAPEI's continuous efforts to excel, we participate in a quality management program under ISO 9001, where we can demonstrate that our working methods conform to these rigorous standards. The company's R&D chemists continuously review product formulations in light of the latest published research to

minimize the use of raw materials that are hazardous to humans and the environment. MAPEI's goal is to utilize materials that are less hazardous yet still provide the performance requirements for the intended product application.

To maintain the integrity of each formulation, a quality-control laboratory is a vital part of every MAPEI manufacturing facility. QC chemists evaluate all incoming raw materials before they are used in the production of mortars, grouts, adhesives, waterproofing materials and other products. As finished work comes off the production line, samples of all products are tested again to ensure that they meet the requirements of their formulas.

MAPEI tracks its environmental sustainability efforts through the ISO 14001 program for Environmental Management Systems. All manufacturing plants and the corporate offices actively participate to earn and maintain this important certification.


We believe in transparently producing high-performance installation products that are the building blocks to truly sustainable structures. Products with MAPEI's "Green Innovation" logo are developed and manufactured to assist our customers in meeting the health and well-being requirements of certification programs such as LEED, the Living Building Challenge (LBC), and the WELL Building Standard.



# Sustainability is part of **everything** we do

When a company's people, processes and products are all focused on sustaining the environment for today and tomorrow, it becomes a corporation's way of life. At MAPEI, sustainability is built into everything we do.



 The best thing about MAPEI's sustainability is that our efforts are transparent to the public. And we work continuously to inform the public about our sustainability efforts. For details, see our "**Sustainability and Transparency**" brochure at [www.mapei.us](http://www.mapei.us).



# 10 TOP 10 GLOBAL PROJECTS

## The Crème de la crème of MAPEI's global projects

During 2017 the MAPEI subsidiaries around the world submitted write-ups of 370 projects that used MAPEI products for an intra-company competition. In celebration of MAPEI's 80th anniversary, the MAPEI Group's Marketing Department selected 80 of these projects as winners of the competition. Rated the best of the best, 14 of these projects received special recognition at the company's annual International Marketing Meeting. We are proud to present 10 of those projects over the next several pages in order to give our readers an idea of the breadth and depth of MAPEI's solutions for the construction industry. (Note: MAPEI materials vary by the geographical location of the project, and products mentioned here may be available only in those locations.)

### 1. The Brooklyn Battery Tunnel – New York, New York, USA

The Brooklyn Battery Tunnel, officially known as the Hugh L. Carey Tunnel, crosses under the East River at its mouth, connecting the Borough of Brooklyn on Long Island with the Borough of Manhattan. At 9,117 feet (2,779 m) in length, it is the longest continuous underwater vehicular tunnel in North America. After the tunnel was flooded by Hurricane Sandy in October 2012, 60-million gallons (227-million Liters) of water were removed from its two tubes. The damage done to the walls of the tunnel from the floodwaters and the removal process had to be repaired, and 800,000 tiles had to be replaced.

Gibraltar Contracting, the tile contractor on the project, was asked to float a new mortar bed and install 400,000 square feet (37 161 m<sup>2</sup>) of 6" x 6" (15 x 15 cm) Agrob Buchtal "Chroma" facade tiles across walls 15 feet high (4,57 m) of the 1.73 miles (2,78 km) of the Manhattan-to-Brooklyn side of the tunnel in the first phase of the restoration work. The contractor selected MAPEI solutions for the repair and restoration of the tunnel, and all materials were supplied by MAPEI distributor ProTile, Inc.

The Gibraltar crew applied two lifts (float coats) of MAPEI's **Modified Mortar Bed**, which is a premixed, cement-based, polymer-modified thick-bed and render mortar that includes a blend of select aggregates. Once the walls were repaired, the tile crew began re-setting the tiles. All the tiles were set with **Ultraflex 3**, MAPEI's strongest mortar in the *Ultraflex* series. The crew then grouted all the joints with **Ultracolor Plus FA**, which produces no efflorescence.



## 2. Temple Sagrada Familia – Barcelona, Spain

The Temple Sagrada Familia, a large Roman Catholic church located in Barcelona, has been under construction since 1882, and is not expected to be completed until 2026. An example of Gothic architecture, the church has been declared a UNESCO World Heritage site.

MAPEI products were used in a recent project to install underfloor heating in the main area of the church. **Primer G** was applied directly over the heating installation, and then **Novoplan Maxi** was applied by pumping to provide a smooth, level substrate. Tiles of natural stone were then set with **Keraquick S1** mortar and grouted with **Ultracolor Plus**.



## 3. Emissor Oriente Tunnel – Mexico City, Mexico

When completed, the Emissor Oriente Tunnel Project will extend a length of 38.5 miles (62 km). At 23 feet (7 m) wide, the tunnel will include 24 branching shafts of 39 to 52 feet (12 to 16 m) in diameter.

Thus far, MAPEI has provided **Mapeblox T** protection sealant mainly for project sections I, II and V, as well as **Polyfoamer FP/CC** and **Polyfoamer FLS** foams for the conditioning of the soil during excavation in project sections I, II, V and the TBM exit portal. The polymers **Mapedrill M1** and **Mapedrill SA1** have been used as solutions to different problems that have appeared in the different sections due to the necessity of soil conditioning.

**Resfoam SS 75** has been used for waterproofing and stabilization of the terrain in different sections during the excavation of the tunnel. **Planitop X** has been used for the repair of tunnel lining segments as well as to correct imperfections for the tunnel's finishing touches.

## 4. Sapphire – Berlin-Mitte, Germany

Sapphire, the Daniel Libeskind-designed residential apartments in Berlin-Mitte, was created with the characteristic corners and edges favored by the renowned architect. Each of the 73 apartments and penthouses in the exclusive building is unique and equipped with high-quality multi-layer prefabricated parquet, installed with MAPEI system products.

Sustainability was a high priority of the design, so the substrates were first primed with **ECO Prim T Plus** and leveled with **Ultraplan Plus**. Expansion joints were covered with **Mapetex VLIES** de-coupling membrane to provide a seamless surface for the installation of the prefabricated parquet with **Ultrabond Eco 940S 1K** adhesive.





## 5. “Nagyerdei” Water Tower – Debrecen, Hungary

The reinforced concrete structure of the “Great Forest” water tower in Debrecen, originally built in 1914, has been transformed into a lookout tower and community space. In addition to renovations of the existing structure, an exhibition room was created on the reception floor and an outdoor event space was set up.

Bathroom surfaces were primed with **Primer G** and leveled with **Ultraplan Eco 20. Mapelastic** with **Mapeband Tape** was used for waterproofing showers. Tiles in these interior spaces were set with **Adesilex P9** and grouted with **Keracolor FF Flex**. On the exterior, **Keraflex Light S1** was used to re-tile damaged wall surfaces, and natural stone tiles installed on the steps used **Keraflex Maxi S1**.

In the café, resin flooring was installed using **Primer SN** and **Mapefloor I 302**. The stairs of the tower were repaired and leveled using **Mapegrout 430** mortar, then covered with **Primer SN** and **Mapefloor PU 410**. The entire facade of the tower was painted with **Elastocolor Pittura** after priming with **Elastocolor Primer**.



## 6. Loeriesfontein Wind Farm – Hantam, Northern Cape Province, South Africa

As part of South Africa’s Renewable Energy Independent Power Producer Programme, 122 wind turbines were built in the Hantam community in Northern Cape Province. Each windmill base comprises approximately 2,543 cubic feet (72 m<sup>3</sup>) of concrete blinding, 12,925 cubic feet (366 m<sup>3</sup>) of ultra-low carbon footprint concrete and 848 cubic feet (24 m<sup>3</sup>) of concrete plinth.

Admixtures supplied by Mapei South Africa included super plasticizer **Dynamon Easy 34** to reduce mixing water requirements by increasing the plastic rheology of the concrete. **Mapefibre NS12** was included in the mix to reduce the formation of cracks induced by the hygrometric shrinkage of concrete at the fresh and hardened stages.

Protection against rapid moisture evaporation in the high-temperature, low-humidity conditions was ensured with the use of **Mapecure E** curing compound. Contributing to the impressive finishes of the concrete foundations was the use of MAPEI’s universal form-release agent **DMA 2000**, which counteracts the adhesion of concrete to all types of forms, including iron, aluminium and plastic.



## 7. Viceroy Hotel – Palm Jumeirah, Dubai, United Arab Emirates

The Viceroy Hotel is a five-star resort situated on the “trunk” of the iconic tree-shaped Palm Jumeirah archipelago. Its distinctive design and remarkable architecture was inspired by ancient Roman amphitheaters, with specific influences seen in its glass-clad structure, which allows guests panoramic views of the Arabian Gulf and the Dubai Marina skyline. The hotel features 477 guest rooms, 221 private residences and four penthouses.

MAPEI solutions and products were used throughout the entire hotel at different stages of the project. MAPEI was asked to tackle several aspects with the hotel: 1,614,587 square feet (150,000 m<sup>2</sup>) of marble surfaces as well as the Guinness World Record-holding glass cube, which stands as the centerpiece of the Viceroy.

MAPEI products used on the jobsite included **Ultrabond Eco 375**, **Adesilex P9**, **Keraflex Maxi S1**, **Ultracolor Plus**, **Kerapoxy**, **Mapesil AC**, **Mapesil LM**, **Mapelastic Smart**, **Eco Prim Grip**, **Ultraplan Fiber Kit** and **Keralastic T**.







## 8. Ama Kristina river cruise ship – Amsterdam, the Netherlands

The Dutch river cruise ship Ama Kristina was christened in Lahnstein, Germany, in May 2017 and joined sister ships in cruising the rivers of Europe. To prepare the luxurious ship for its discerning passengers, 12,378 square feet (1 150 m<sup>2</sup>) of wall tiles and 3,929 square feet (365 m<sup>2</sup>) of floor tiles were installed with MAPEI products.

Products for surface preparation, waterproofing, tile-setting, grouting and sealing included: **Primer G**, **Eco Prim Grip**, **Ultramastic 5**, **Mapegum WPS**, **Mapeband PE 120** (PVC tape), **Idrostop Mastic**, **Kerapoxy Design**, **Mapesil AC**, **Eporip**, **Topcem Pronto**, **Ultralite S1**, **Elastorapid A+B**, **Kerapoxy CQ** and **Mapesil LM**.

## 9. St. Regis Hotel at Yunda Central Plaza – Changsha, Hunan, China

Owned by the Yunda Group, the St. Regis Changsha is housed in the heart of Yunda Central Plaza, on the 48th to 63rd floors in one of the city's tallest skyscrapers. The St. Regis Changsha also enjoys its own helipad on the 63rd floor.

In addition to providing tile and stone installation materials, MAPEI Hunan technical services personnel trained the tiling contractor on the use of MAPEI's products. **Kerapoxy** mortar and grout was used in the outdoor square, lobby entrance, landscape pool, terrace garden and roof garden. **Adesilex P10** mixed with **Isolastic** was used to set tiles in the infinity pool on the 63rd floor and in the presidential suite. **Keracolor FF** mixed with **Fugolastic** was used to grout the pool and the sauna room as well as the presidential suite, the underground garage, the underground supermarket and the food court. **Mapeflex PU 20** was used to fix expansion joints in the subway passages.



## 10. Napoli-Afragola railway station – Afragola, Naples, Italy

The Napoli-Afragola station on the Rome-Naples high-speed rail line opened in June 2017. With a futuristic design from architect Zaha Hadid, Napoli-Afragola welcomes visitors as a key interchange station for four of the inter-city lines.

MAPEI supplied materials for concrete repairs and a resin floor application in the station. Products included **Eporip** epoxy adhesive, **Mapegrout LM2K** cement mortar, **Mapecoat I 600 W** transparent epoxy primer, **Planitop Fine Finish** skimming mortar, **Malech** water-based acrylic undercoat and bonding promoter, **Colorite Beton** anti-carbonation acrylic paint, **Mapegrout T40** concrete repair mortar, and **Mapefloor System 31** multi-layered epoxy system for industrial floors.



If you want to learn more details about these 10 references, visit the Project References section of MAPEI's website at [www.mapei.com](http://www.mapei.com).






MAPEI's  
**TALL TALES**

"Work and art are linked by passion and never to be separated."

– MAPEI founder Rodolfo Squinzi



So begins a book of short stories about projects of historical significance where MAPEI products played a role. These amusing "tall tales" share a whimsical look at MAPEI from some very funny points of view – from Napoleon to the tiles at the Vatican. The first one is published in this issue of *Realtà MAPEI Americas*, with more to come in future issues.

## Niguarda Major Hospital, Milan

# The duke with a flair for the finishing touch

(A tale told by a spirit)

If you want to know what I looked like, visit the Pinacoteca of Brera Art Museum. There you'll find my portrait painted by Bonifacio Bembo. It's a profile, much in vogue at the time. My curly hair and prominent nose are ushers to an intuitively melancholy gaze. I was a valiant leader of men in my day. My cohort of mercenaries served the cause of several Italian princes. I later lay down my arms at the court of the Viscontis in Milan, taking up the reins of duke and diplomat. Machiavelli always had a good word for me and for the Treaty of Lodi that I largely helped to broker between Venice and Milan. Behind me were many battles, much bloodshed and suffering. Perhaps that explains why I wanted a hospital for Milan. The city had only a few small infirmaries. It needed a large building, a major work, to replace them all and provide free medical care to its poor.

It was I, Duke Francesco Sforza, who built Milan's Major Hospital. It was 1456. It's still my pride and joy. It was a major undertaking and the Milanese were much obliged. Even today they call it Ca' Granda, Casa Grande. It instantly became a model for other hospitals. Yet, as time passed, a building designed for 288 patients could simply not keep pace with the growing population of Italy's most industrialized city. By the late 1800s they moved my hospital to a building beyond the Naviglio canals.

And I followed it all, keeping watch silently as I was invisible. It was a good show, even if I say so myself. No word has ever been uttered about the Duke's ghost haunting it. Very discreet, thank you. So,

I've seen my prodigy grow, expanding in wards and specialist care.

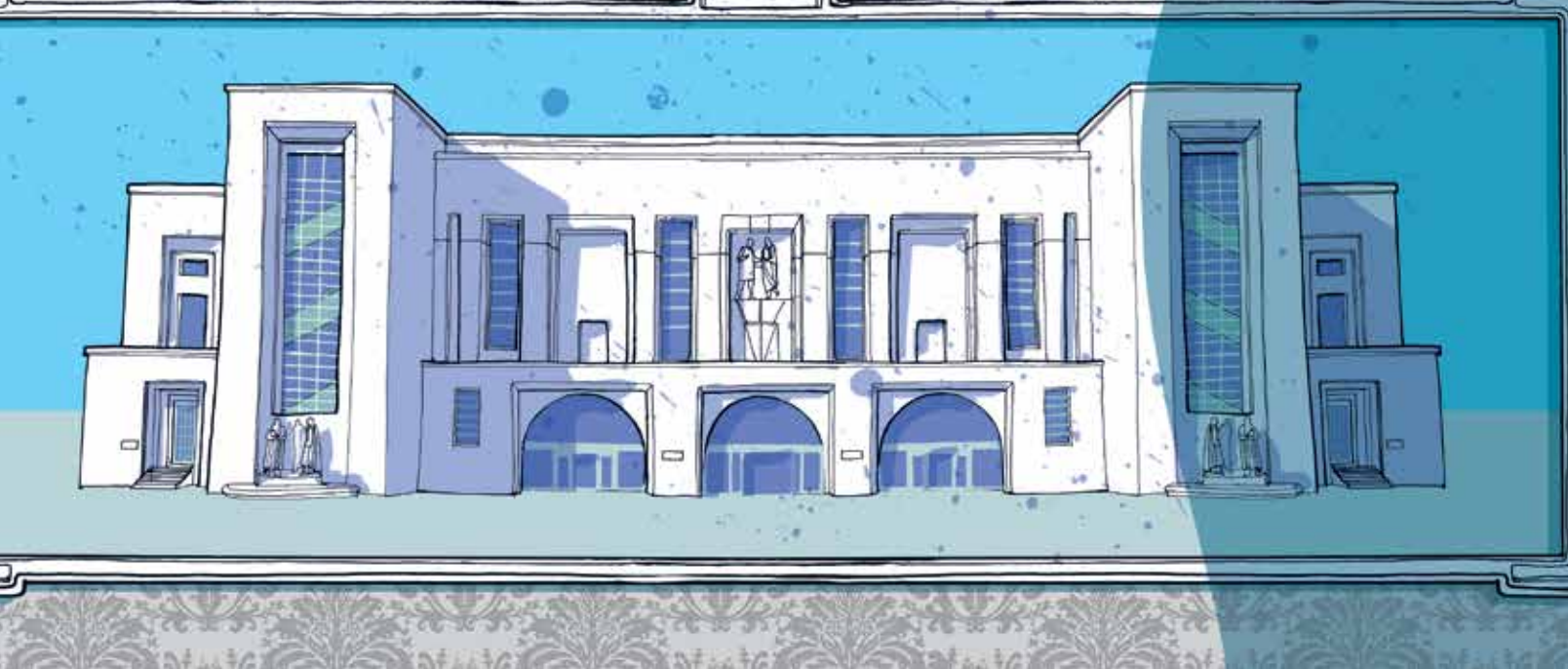
There's one thing, though, that hasn't been mentioned. Most people know all about my valor in arms and artful diplomacy. Few, however, speak about my passion for building and its techniques.

Even as the blueprints of the hospital took shape, I wanted only the best craftsmen and products involved. I must confess, too, that I always tried to influence the decisions of engineers and suppliers all through the following years, say, breathing on the necks of foremen, dropping a sheet of paper that reveals a cost estimate... little things, really. So, when MAPEI started renovations in 1938, you might say I had a hand in it. It was a young company then, but I recognize quality when I see it. After all, I've got more than 500 years' experience.

The façade needed new fire-resistant skin. *Silexcement* was ideal for the job. The steps needed a decorative plastic coating. *Quarzolite*, invented by the company's fabled founder Rodolfo Squinzi, was just the thing. And time has proved me right.

Since then MAPEI has become an industry leader. And it still takes care of all the work my hospital needs despite the fact they now call it Niguarda. The other day Mr. Giorgio Squinzi, who now heads MAPEI, came to the Pinacoteca di Brera. He stopped in front of my portrait. I winked. He blinked. Wonder if he noticed.









## MAPEI AT WORK ON ROADS AND BRIDGES WORLDWIDE

Roads and bridges around the world have used MAPEI products, including a variety of concrete admixtures, repair mortars, decorative protective coatings, structural strengthening products to sustain heavy traffic, and waterproofing to protect against extreme weather conditions.

MAPEI solutions are tailored for each project's needs, from structural strengthening products for the busy Champlain Bridge in Canada to admixtures for the fire-breathing Dragon Bridge in Da Nang, Vietnam.

All of the roads and bridges featured here offered a unique set of challenges. As a recognized leader in the construction industry, MAPEI provided concrete repair solutions that met those challenges. Products like **Mapelastic®** were used to provide UV stability and salt resistance, while **Mapefer™ 1K** prevented corrosion and fast-curing repair mortars like **Planitop® XS** reduced downtime. To view in detail how each project was accomplished, visit the References page at [www.mapei.com](http://www.mapei.com).

This pictorial shows some of MAPEI's road and bridge projects from around the world.

- 1 Dragon Bridge in Da Nang, Vietnam
- 2 I-80 Verdi Bridge in Nevada, USA
- 3 Champlain Bridge in Montreal, Canada
- 4 Bridge over Arade River in Portimão, Portugal
- 5 Viaduc des Eaux des Fontaines in Court, Switzerland
- 6 Vallcarca Bridge in Barcelona, Spain
- 7 BRE.BE.MI highway viaduct in Milano, Italy
- 8 The Atlantic Road in Molde, Norway





The **MAPEI Technical Institute (MTI)** provides the highest-quality, basic product knowledge with demonstrations and hands-on training to architects, contractors, installers and distributors in 9 locations: Deerfield Beach (FL), San Bernardino (CA), Garland (TX), Dalton (GA), West Chicago (IL) and Swedesboro (NJ), all in the USA; and Laval (Quebec), Brampton (Ontario) and Delta (British Columbia), all in Canada.



## 2017 MTI workshops were a big hit

MAPEI Technical Services had a very successful 2017, with all the MTI workshops filled to capacity. Attendees enjoyed the seminars and the hands-on practice in the workshops. A number of “selfies” appeared on social media, attesting to the hard work and the fun. Plans are already underway for the 2018 MTI schedules.

## MTI-TV on MAPEI’s Website

Look for two new MTI-TV videos on MAPEI’s Website.

- MTI-TV #9 highlights a discussion between Technical Services Director Dan Marvin and *UltraCare™* Systems Business Development Manager Nick Valenti. In this episode, Nick explains “Tackling Grout Haze the *UltraCare* Way.”
- In the new MTI-TV product spotlight for **Mapeguard® UM** underlayment membrane, Dan Marvin and National Technical Presenter Sam Biondo detail the technical aspects of this superior membrane.

For registration information on U.S. seminars, please contact Sophia D’Amico-Campbell at (954) 246-8555.  
For registration information on Canadian seminars, please contact Marie-Christine Mercier at (450) 662-1212.



## MAPEI team members



**Harold  
Hays**

Harold is the Technical Services Manager for MAPEI's Below-Grade Waterproofing division. He provides technical assistance to sales reps, waterproofing contractors, general contractors, distributors, architects, consultants and building owners on below-grade waterproofing, above-grade waterproofing (in the horizontal plane), and air and vapor barriers. Harold has worked in the building envelope systems market for 15 years and has been in the construction industry for 37 years. He is an active member of the Sealant, Waterproofing and Restoration Institute (SWRI) and the Roof Consultants Institute (RCI).

Guido has joined MAPEI North America as the product line manager for our new Marine Industry product line. He has a strong background in this market along with knowledge of the key customers that make up this industry segment. Guido received his degree in Environmental Engineering from Politecnico di Torino (Turin, Italy), with a specialization in Underground Building Techniques. He was formerly a sales manager for Cetena S.p.A., a subsidiary of Fincantieri Group. The marine industry encompasses shipbuilding for leisure, cruising, cargo transportation and national defense vessels, in addition to off-shore petroleum producing units and their support vessels. MAPEI's strategic decision to focus on products that can be certified for use in the marine industry has opened new markets for MAPEI, and Guido will spearhead efforts in this category of the construction industry for North America.



**Guido  
Sardi**



**Claudio  
Genoria**

Claudio, who has served as the manager of Technical Services for the MAPEI/GRT subsidiary, has been promoted to the new position of key account manager for the concrete admixtures subsidiary in North America. Claudio's unique background in the global admixture and concrete market will be a significant benefit to GRT. He will work closely with the GRT sales team in securing the necessary regional and local contacts within the multinational concrete producers' community. He will also work with MAPEI's global concrete admixtures team, led by Walter Nussbaumer, Director of the Liquid Admixtures Division of MAPEI Group. This interaction will ensure that large, multinational concrete producers have full access to MAPEI's full product offering and increase MAPEI's visibility as a world leader in the concrete construction market.

ProSpec LLC reception



Luigi Di Geso and Lou Giannini



Lou Giannini and his family



Steve Jones



Steve Sommer



Serge Drouin



Steve Siciliano and his family

## MAPEI attends ProSpec LLC's 20th anniversary celebration featuring design seminar

The design of the Jerome L. Greene Science Center at Columbia University's Manhattanville campus in New York City was the focus of the 20th anniversary celebration of ProSpec LLC, a prominent New York distributor of tile and MAPEI's tile and stone installation systems. Taking an original approach, founder Lou Giannini and partner Steve Siciliano offered guests more than just a party to celebrate 20 successful years in business. They rented out the Museum of the City of New York for the evening and invited architects, builders, contractors and project owners to enjoy "Design at its Core," a study in depth of the design and construction of the Jerome L. Greene Science Center.

Three speakers – Steve Jones, Senior Director of Industry Insights and Research at Dodge Data & Analytics; Serge Drouin, Associate at Renzo Piano Building Workshop; and Steven Sommer, Principal of Lendlease Construction – presented on the design and construction of the Greene Science Center and on trends in construction in the New York metro area as part of the informational seminar.

Following the presentations, guests enjoyed cocktails and hors d'oeuvres as they toured the exhibits about New York and its history on display in the museum. In attendance was Luigi Di Geso, CEO of MAPEI North America, who commented, "ProSpec has taken the opportunity of its 20th anniversary to point the way to the future with an innovative and successful strategy that mirrors MAPEI's own efforts to provide total solutions to its customers. By bringing together members from various aspects of the construction industry and demonstrating through the Jerome L. Greene Science Center project the ways in which collaboration promotes innovative, sustainable results, Mr. Giannini is establishing a model that can take everyone's productivity to the next level. We congratulate Mr. Giannini and Mr. Siciliano on their company's anniversary and on the forward-thinking ideas."



# LET'S MEET UP ON SOCIAL MEDIA



Social media is a valuable tool that we all use to connect with the world around us. With Facebook and many other social media platforms, MAPEI is engaging users with a variety of exclusive content. We share buzzworthy industry news, installation insights, innovative products, an inside look at the MAPEI Technical Institute (MTI) trainings, sponsorships, and trade show coverage with special posts via #MediaMonday, #TechTipTuesday, #WhatsNewWednesday, #MAPEICanadaThursday, #FunFriday and #InternationalSaturday.

Get involved with the world of MAPEI by joining us online. Follow, like and share with us by using the keyword "MAPEI Americas." And as you discover our products and try them for yourself, share your successes and experience using the hashtag #MAPEIAmericas.

Join the conversation. We're listening.



Keyword: MAPEI Americas

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1-800-42-MAPEI (1-800-426-2734)

### Technical Services

1-800-992-6273 (U.S. and Puerto Rico)  
1-800-361-9309 (Canada)

### Services in Mexico

0-1-800-MX-MAPEI  
(0-1-800-696-2734)

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# Underlayment solutions for tile and stone installation



## **Mapeguard® UM**

Underlayment membrane for ceramic tile and stone

- Uncoupling, waterproofing and water vapor membrane
- FastTrack Ready™: Approved for use over young (green) concrete and mortar beds
- Approved for use with polymer-modified mortars
- Prevents transmission of in-plane substrate cracks up to 1/8" (3 mm)
- Reduced "roll memory" and unique tri-layer construction keep membrane flat
- Engineered cavity design with mesh allows easy single-pass filling of surface core
- Extra Heavy Rating: ASTM C627
- Light green translucent color allows visibility of mortar coverage
- Laser and chalk lines are easily visible on the surface

