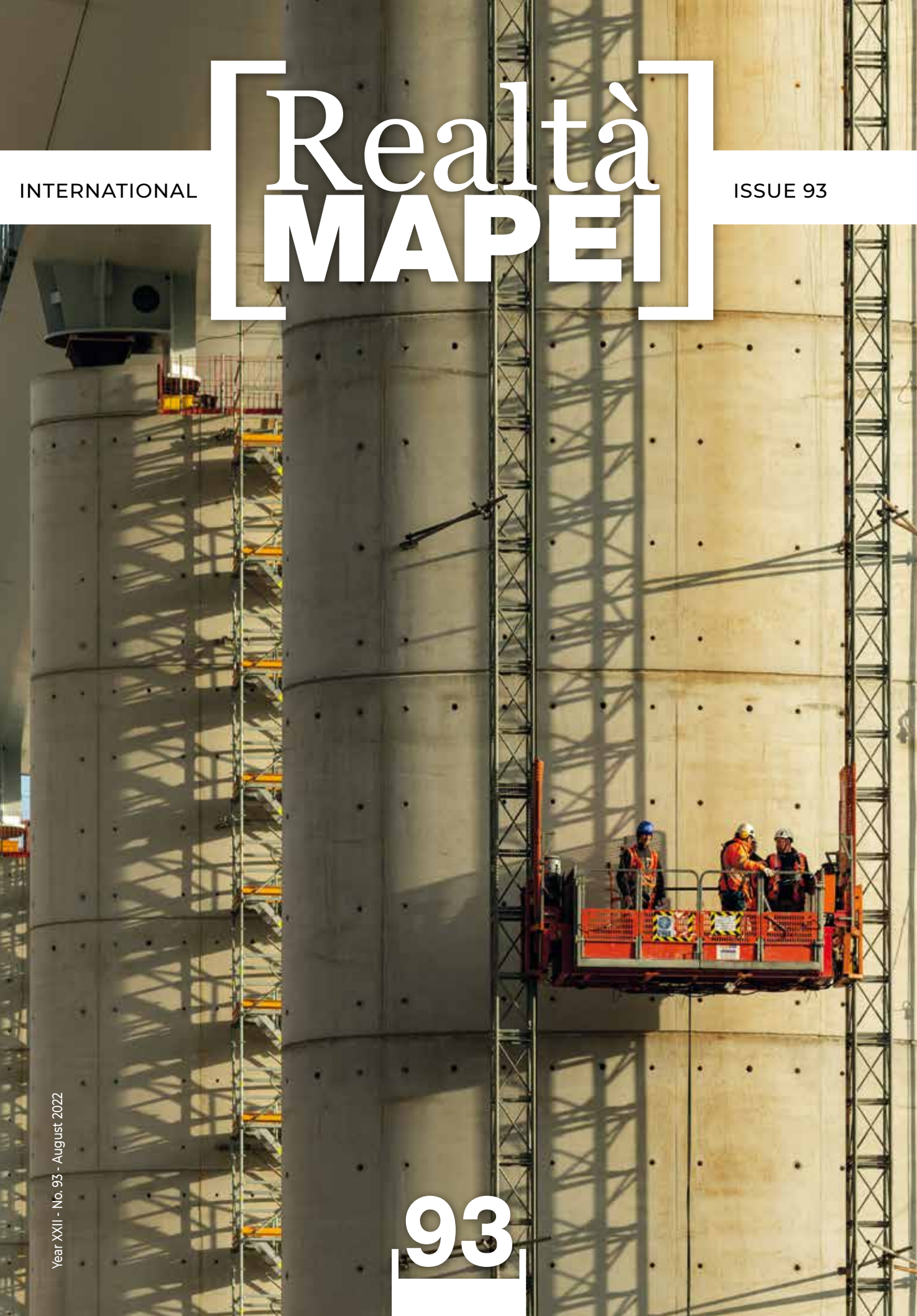

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SUMMARY

Cover story
The focus of this issue of *Realtà Mapei International* is on Mapei solutions for increasing sustainability in the concrete industry. Mapei products, tools and human resources help the concrete industry to become more and more sustainable at all stages, from cement production to recycling waste.
Photo: Filippo Vinardi, Webuild Image Library

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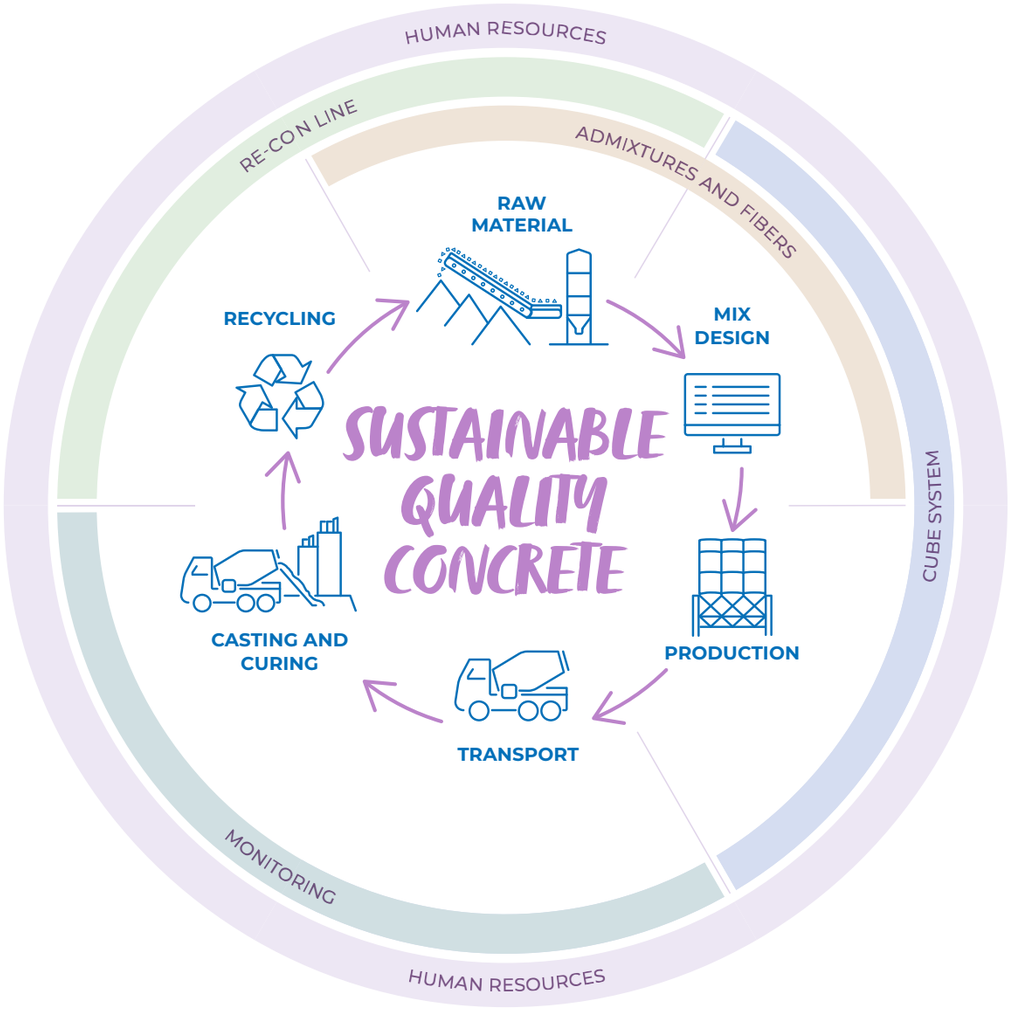


Mapei's across-the-board contribution to a more sustainable concrete manufacturing industry.

by **Walter Nussbaumer**

Integrated solutions for a sustainable future

INNOVATIVE USE OF RAW MATERIALS, ADMIXTURES AND HIGH-TECH TOOLS IN PRODUCTION PROCESSES: THE CONSTRUCTION INDUSTRY IS UNDERGOING A MAJOR TRANSFORMATION

As a change towards a circular economy will be essential for waste/resource management, value creation and economic growth in the coming years, Mapei developed innovative solutions for the concrete industry that integrate raw materials, concrete admixtures, and digital solutions in a circular quality and sustainable process.
This is made possible by the Research & Development work carried out in the Central R&D laboratories in Milan and other 31 regional/local R&D centers across our global operations.
Our focus is the total life cycle of a structure, by reducing its carbon footprint through high end products and process automation, increasing its value. Indeed, our solutions are specifically developed to meet the needs of the industry professionals at every stage of the life cycle of concrete: from the production of cement to the concrete mix design, from the production of concrete to the transportation to the site, from casting to the recycling of returned concrete and washing slurry resulting in clean mixer drums and waste reduction.
Mapei solutions for the concrete industry contribute to sustainability by supplying innovative product systems, offering dedicated human resources, ensuring quality, enhancing productivity and durability, and reducing waste.
Our goal is to "deliver sustainable quality", support our customers, and be a strong and reliable partner to the concrete industry.

Corporate Liquid Admixtures Director, Mapei Group

Marco Squinzi, CEO of the Mapei Group.

On the road to sustainability

MARCO SQUINZI, CEO OF MAPEI: OUR CONTRIBUTION TO LOW CARBON FOOTPRINT CONCRETE

Why is it so important to focus attention on sustainability in the production of concrete?
The concrete industry is looking into every avenue possible to reduce the impact it has on the environment, in terms of both carbon footprint and the concept of circularity, focusing on construction and demolition waste and optimising the consumption of virgin raw materials. Concrete is such an important construction material that we have no other choice than to focus on this issue, both in our Research & Development laboratories and by collaborating with our clients. This approach is part of Mapei's DNA because we have always developed products and solutions by investing in Research. In fact, we are absolutely convinced that you cannot achieve sustainable growth without Research & Development: for us the road to sustainability is, first and foremost, through innovation. In Mapei we dedicate more than 70% of R&D work to product optimisation to make them more and more durable, of the highest quality and to have less impact on the environment. The 32 R&D laboratories of the Group focus on solutions for the recovery and recycling of materials, the aim being to contain the consumption of virgin raw materials entering our facilities and to partially replace raw materials with a high impact on the environment, in terms of both formulation and packaging, to promote a circular economy.

What activities are being carried out to reduce the carbon footprint of concrete?
Cements with low CO_2 emissions are being produced which are mixed with supplementary cementitious materials (type II, III, IV and V cements), and which may be used to replace traditional type I cement in most applications. The latter types, which have a high clinker content, have a larger carbon footprint compared with "alternative" cements. The challenge for our clients is to use these cements to make concrete with the same properties as traditional concrete at both the fresh state and hardened state. These types of concrete, with less impact on the environment, develop the mechanical properties required for construction work more gradually, so we are also developing admixtures that help this new generation of materials increase their initial and final mechanical properties, without reducing their durability. Our **CUBE System** and **MAPEFAST ULTRA** admixture (that makes use of Secondary Nucleation technology and was used for the San Giorgio Bridge in Genoa) offers the most complete range of strength enhancers on the market. We have worked on every type of cement with low CO_2 emissions and we are in a position to propose solutions for every type of cementitious material. The system offers a platform that helps our clients produce concrete with stable and predictable characteristics.

> **"We work together with concrete manufacturers to reduce the carbon footprint of this material**

In what way can the products offered by Mapei help overcome the problem of the scarcity of natural raw materials?
Part of our offer for the concrete industry focuses on increasing the possibility of using recycled and recovered materials and recycling returned concrete, that is, concrete excluded from construction operations. Some of our solutions – I am thinking about the **RE-CON LINE** here – help limit the production of waste and the consumption of natural resources. In fact, the availability of sand and aggregates is diminishing in many areas due to the increase in their extraction to meet the growing demand of the world of construction and even water is becoming a critical resource and we must avoid wasting or polluting it. RE-CON ZERO technology, which is used to transform returned concrete into new, reusable aggregates without producing any waste, earned us the 2019 Circular Economy Award: a great example of how the contribution of the construction sector is fundamental in the implementation of the principles of a circular economy. The **RE-CON DRY WASHING** technology, which is unique in the world, allows the dry washing of the concrete mixing trucks with almost no water.

> **"Part of our offer for the concrete manufacturing industry is focused on increasing the opportunities to use recycled/recovered materials**

On a global level, is there a new, growing awareness in construction work as regards sustainability?
The main challenges today are played out at various levels. The global application of voluntary eco-sustainable building protocols such as LEED and BREEAM, for example, is playing a fundamental role in ecological transition, a stimulus for the use of certified products in the construction industry. And, the inclusion of Minimum Environmental Criteria (CAM) in local authorities' purchasing process in Italy has undoubtedly acted as a stimulus to come up with a different approach to design and construction, taking into consideration the life cycle of an entire building. And lastly, in the infrastructure sector, the Envision protocol is also becoming more widely adopted in Europe. This is the first rating system, developed with the contribution of the University of Harvard, for designing and building sustainable infrastructure.

What role does the digitalisation of processes play?
One of the advantages of digitalisation is that it can be used to facilitate and integrate processes. In the specific case of the concrete industry, the entire production, logistics and application process can be monitored to help reduce its impact on the environment even further, while at the same time maintaining very high-quality standards. Today, we have Mapei CIS (Concrete Industry Solutions), which proposes an integrated approach consisting of concrete admixtures and monitoring and control technologies. In collaboration with Elettrondata, we have developed software that allows to optimise concrete mixes taking into account their LCA (Life Cycle Assessment) and carbon footprint, as well as monitoring the performance and rheological characteristics of concrete, not only at the production facility during production, but also during transport up to the final delivery. The aim is to also be able to make all these data available digitally when traceability of materials will be required for constructing a building. We are always one step ahead.

Mapei has a long history of collaborating with universities: what results have you achieved in this sector?
Mapei collaborates with the scientific community to share ideas and know-how. In 2021 we developed a cutting-edge accelerating admixture for concrete in collaboration with Centro CIRCe (Interdepartmental Research Centre for the Study of Cementitious Materials and Hydraulic Binders) at the Faculty of Geosciences of the University of Padua (Italy). And it is precisely to contribute to the eco-sustainability of concrete structures that we are participating in a pilot project at the University of Brescia, with financial backing also from the EU as part of the PNRR (National Recovery and Resilience Plan) initiative, for the development of a concrete mix with less impact on the environment and high mechanical properties, which will then be used in the construction of the Milan Innovation District (MIND).

A story that started with the Pantheon in Rome

CONCRETE CONSTRUCTION TECHNOLOGY HAS ANCIENT ORIGINS AND IS CLOSELY LINKED TO THE DEVELOPMENT OF BINDERS

The Romans were the first to make systematic use of concrete as a structural material. The technique adopted was concrete core walls, characterised by placing lime and Pozzolan mortar conglomerate with rough stone or fragments of stone and brick between two facing walls made from blocks of cut stone.
The conglomerate used had good mechanical characteristics and was resistant to water. Amongst all the applications of this technique, the most representative is undoubtedly the cupola of the Pantheon temple in Rome, built in 27 BC. With an internal diameter of 43.44 m, it is the largest ever built out of non-reinforced concrete.
During the Middle Ages stone again became the main construction material for the most important buildings, from churches to castles, and the use of Pozzolan was abandoned in favour of binders such as lime.
During the Renaissance there was another change in direction, with bricks usurping stone as the material of choice. In this period the use of render became more widespread, which was used as an architectural element to provide protection and to act as a binder, as well as for its aesthetic properties to decorate buildings.

The Pantheon in Rome, built in 27 B.C., is the largest construction ever built out of non-reinforced concrete.

The creation of modern concrete
Construction procedures did not undergo any significant change until the end of the XIX century. Between the end of the eighteenth century and the beginning of the nineteenth century, the first mixes were developed to recreate the behaviour of the natural binders – lime and Pozzolan – used until that moment.
The creation of modern concrete dates back to 1818 thanks to the intuition of Louis-Joseph Vicat. The development of Portland cement by Joseph Aspdin, his son and others in the first half of the 19th century and the invention of steel reinforcement by Joseph Monier in 1867, and its consequent use within concrete elements and structures, were the starting point for the wide-ranging use of this material in the construction of buildings and infrastructures we know today.

The innovation of Le Corbusier
Reinforced concrete soon became the language of modern times: it was used to create civil buildings in previously unheard forms and spread around the world thanks, above all, to the patents of François Hennebique and the works of Auguste Perret. In his works Perret applied design rationalism to the "crudity" of reinforced concrete, giving it also an innovative look from an aesthetic perspective. Le Corbusier continued in this quest and brought an end to the old way of constructing homes, replacing them with buildings in reinforced concrete.
The theory behind this new construction model is explained in the collection of essays entitled "Toward an Architecture", where Le Corbusier claims that the home must become a machine to be lived in and new materials, such as reinforced concrete, must become functional instruments for living and infrastructural needs. Le Corbusier's idea was to use reinforced concrete to meet the need for the urban development of large cities and the need for living spaces. A symbol of this theory is the "Unité d'Habitation", the enormous building designed by the architect to overcome the shortage of housing in Marseille (France) after the end of the Second World War.

A resistant and versatile material that allowed to create news shapes for buildings and infrastructures

The "'Unité d'Habitation" in Marseille (France) designed by Le Corbusier and built using reinforced concrete.

The Pirelli Tower in Milan, designed by Gio Ponti in 1950 and built by using reinforced concrete.

Reinforced concrete in Italy
The avant-garde of Italian architecture certainly did not remain immune to this drive towards the use of reinforced concrete. These new forms, which in France and Germany had contributed to the birth of Modernist architecture, also entered into the language of Italian Rationalism, applied by architects and engineers fresh out of the civil engineering faculties of Polytechnics where teaching of the reinforced concrete technique had started to spread.
And it was against this backdrop that some of the most significant works of contemporary Italian architecture were created, such as Torre Velasca and the Pirelli Tower. And it is no coincidence that these two structures, icons of Italian architectural heritage, were built in Milan, the true "father" of Italian reinforced concrete.

Nothing lasts forever
It is right to point out that, in the final twenty years of the last century and the first twenty years of this century, it became clear that concrete, with all its inherent qualities, inevitably shows the effects of time and requires scheduled and non-scheduled maintenance, just like any other element or material. The importance of the correct approach to the conservation of concrete architecture started to be discussed, also in the wake of dramatic events such as the collapse of the Morandi Bridge in Genoa in 2018. Since then a new bridge has been built in its place, the San Giorgio Bridge, with Renzo Piano commissioned for its design. The architect wanted to build it using the very same materials – steel and concrete – for its 19 spans and 18 piles and Mapei supplied innovative admixtures for their construction as you can read in *Realtà Mapei International* no. 82 and later on in this issue of the magazine.

A record-breaking material with so many advantages

10 BILLION CUBIC METRES OF CONCRETE ARE USED EVERY YEAR AND CONSUMPTION IS DESTINED TO GROW

Concrete is produced by mixing a binder with water and fine and coarse aggregates (sand and gravel). In the fresh state it is a plastic mass with density of around 2400 kg/m^3 which can be poured into moulds in various shapes and dimensions, while in the hardened state it takes on its own solid form and volume with excellent mechanical properties and durability. These properties, along with its widespread availability and low cost of the raw materials, have decreed its enormous success, making it by far the most widely used material around the world.
The most widely used binder for the production of concrete is Portland cement which, in its simplest formulation, is a fine powder with average particle size of few dozen microns, obtained by grinding clinker and calcium sulphate. Clinker is produced by heating limestone and clay substances in a kiln to around 1450 °C, thus forming new mineralogical phases with hydraulic properties.
Every year more than 10 billion m^3 of concrete and 4 billion tonnes of cement are produced. These figures are destined to grow even further over the course of future decades, mainly for the need of meeting the rate of development in Asiatic and African countries.

Why is **concrete** so widely used?

The answer lies in the excellent mechanical properties, versatility and durability of concrete compared with other materials, such as wood and steel. What is more, no other material has the same advantages at such a low cost and with such widespread availability. In fact, concrete is always produced using locally-sourced raw materials by mixing cement, water, sand and aggregates.

Characteristics: **the three strong points**

Concrete is a material with particularly high mechanical characteristics: its very high compressive strength, coupled with the tensile strength of the fibers or reinforcement used to “strengthen” it, allows enormous structures to be constructed, such as bridges or other infrastructures.
Also, because concrete can be “moulded”, it is able to take on the form most suitable for its particular structural function. Concrete is, therefore, a particularly “functional” material that enables the most suitable design solutions to be found, such as the construction of a wide-span bridge to cross over a river or a tall building to limit the use of soil.
This property makes concrete an even more valid proposition with respect to other construction materials. The progressive transformation from a plastic state to a solid state allows concrete to be used to make elements and structures of various forms and with considerable aesthetic impact. Engineers and architects from every era have exploited this property of concrete to build incredibly beautiful and functional structures, a clear demonstration of its considerable aesthetic potential. Developments in construction technology, with the introduction of digital technologies such as 3D printing, will undoubtedly lead to an even more “creative” use of concrete.
Concrete is also a particularly durable material with the ability to withstand deterioration produced by ageing and exposure to the effects of aggressive chemical agents. Its high pH also serves to protect the steel reinforcement rods embedded in concrete structures against corrosion.

1 Strong

Structures with high mechanical properties are constructed thanks to concrete, such as the bridge on the island of Krk in Croatia.

2 Mouldable

Buildings designed by Zaha Hadid exploit the potential of concrete to create curved forms and sinuous lines.

3 Durable

Concrete structures perform excellent durability, such as the Storebælt Bridge in Denmark.

The role of **admixtures**

Concrete technology is making increasingly extensive use of admixtures, which have become essential ingredients in modern concrete. Even though they are used at dosages of just a per cent fraction compared with cement, admixtures can significantly modify the characteristics of concrete, at both its fresh and its hardened state. Thanks to super-plasticizing admixtures, it is possible to design concrete with a service life of more than 100 years and to pump fresh concrete to considerable heights to build structures hundreds of metres tall. Retarding admixtures enable fresh concrete to be transported over long distances and in hot weather without losing its workability and mechanical properties. The latest generation of accelerating admixtures allow concrete to develop its mechanical properties after short curing cycles and in cold weather and to modify the microstructure of the cementitious paste, helping to further improve the durability of structures.

Sustainability and **concrete**

The enormous success of concrete poses, at the same time, the problem of depleting the natural resources required for its production. Each inhabitant of the planet has their own personal annual “budget” of around 1.25 m^3 of concrete.
On a global scale that CO_2 emissions generated by the production of cement amounts to around 3.2 GTonne/year, or around 8% of the total production of CO_2 of anthropic origin.
Amongst the various initiatives implemented by the cement industry to reduce CO_2 emissions and, as a result, the impact of concrete on the environment, we have the following:
a) improving energy efficiency during the production process;
b) more widespread use of alternative fuels with lower emission levels than traditional fuels;
c) reducing the clinker/cement ratio (k) through the use of supplementary cementitious materials (SCMs) mixed with clinker to produce new types of cement with lower clinker content;
d) the application of innovative technologies to produce energy from heat-recovery systems and the adoption of renewable energy technologies, such as solar energy;
e) the development of CO_2 capture and storage technology within the cement production process.
Admixtures are also destined to play a central role in improving the sustainability of concrete, in terms of both energy efficiency during the clinker grinding process and the optimisation of concrete with low clinker content (LCC, Low Carbon Concrete).
And to overcome these challenges, Mapei is constantly committed to the development of grinding admixtures

(CADD Line) and of new admixtures for concrete with low clinker content (Cube System).
An enormous contribution to the formulation of sustainable concrete may also be attributed to the use of synthetic fibers, with Mapei being one of the leading manufacturers in Europe. The use of fibers to reinforce concrete instead of traditional steel reinforcement leads to a considerable reduction in CO_2 emissions in various applications. Synthetic fibers are added and mixed directly into the concrete, thereby eliminating all the installation phases of classic metal mesh, as well as requiring a much lower amount than with steel fibers. .
The sustainability of concrete can also be improved by using recycled and waste materials, reducing the production of waste and the depletion of natural resources and enabling virtuous processes to be implemented to promote Circular Economy. Mapei has also developed solutions suitable to this type of approach, such as the admixtures from the Re-Con Line (Re-Con Zero EVO and Re-Con AGG).
Besides, Mapei developed an innovative solution to reduce the slurry resulting from washing concrete mixing trucks: the Re-Con Dry Washing process.
We devote a few articles to all the above-mentioned Mapei solutions in the next pages within this special section on concrete and sustainability.

by **Mikaela Decio**

Research to mitigate environmental impact

ECO DESIGN TO REPLACE RAW MATERIALS IN LINE WITH CIRCULAR ECONOMY

We are living in tricky times as our planet is showing worrying signs of suffering, such as high temperatures and the consequent melting of glaciers, droughts and shortages of raw materials, forcing us to find solutions to rectify this situation as quickly as possible.
It is our duty to come up with solutions to reduce the amount of greenhouse gas (GHG) emissions deriving from the building industry. The cement industry, for example, accounts for 7-8% of all global emissions of greenhouse gases responsible for climate change: emissions are expressed by means of an indicator called GWP (Global Warming Potential) measured in tonnes of CO_{2eq} per tonne of product.
Among the SDGs (Sustainable Development Goals) identified in Mapei SpA’s sixth Sustainability Report, a goal is related to Climate Change (SDG 13), which can be pursued by reducing the impact of processes and products. As manufacturers of concrete admixtures and great believers in sustainability, we have decided to focus our research on admixtures allowing the amount of CO_2 in concrete to be greatly reduced.

The LCA methodology
How do we calculate the CO_2 associated with a product? The standardised methodology called Life Cycle Assessment (LCA) allows us to quantify the environmental impacts of a product from cradle to grave: in fact, considering the entire product cycle and using bespoke software (GaBi - Sphera) the Corporate Environmental Sustainability team is able to calculate environmental impacts in accordance with EN 15804:A2 standard for building products.
All kinds of impact are considered: it is not just GWP that is calculated but other indicators, too, such as eutrophication (disturbing the balance of the aquatic ecosystem causing the death of fauna and a decrease in biodiversity), depletion of abiotic resources (i.e. the potential for depletion of mineral and fossil resources), water usage (expressing the potential depletion of our water resources), ozone layer depletion and many others.
The results obtained are then set down in a final document, the EPD (Environmental product declaration) that is verified and certified by the Swedish programme operator ‘The International EPD System’, whose authority is recognised worldwide.

EPDs for more than 200 products
So far Mapei has published 85 EPDs covering more than 200 products which have been studied in terms of their environmental impact using LCA methodology.
LCA studies on Mapei products have shown that the raw materials (their extraction and processing) have the greatest impact throughout the life cycle of a product like, for example, cement, which has a very high GWP value caused by clinker and an extremely energy-intensive manufacturing process. That is why, as well as affecting the supply chain and manufacturing, Research & Development studies are also focused on the substitution of raw materials from an eco-design perspective, in order to obtain products and solutions that are always of a high quality and durable, thereby reducing the amount of construction and demolition waste resulting in increasingly lower levels of impact on the planet and also reducing the consumption of resources. With this in mind, our laboratories have designed CUBE admixtures that can use alternative cements to make concrete that come from secondary raw materials, such as slag, fly ash and pozzolan, and have a lower GWP rating than conventional type I and II cements, which are very rich in clinker.
These admixtures are intended to ensure that a high-performance concrete can also be obtained from a mix containing alternative cements. We have also developed a calculation tool, which proposes a mix using cements with lower environmental impact (type II, III, IV and V cements) and calculates the % of CO_2 emissions avoided per m^3 of concrete. The practical approach characterising Mapei's commitment to sustainability is what makes us stand out: a commitment aimed at reducing greenhouse gas emissions in synergy with our stakeholders in the name of an innovative building industry. Measuring by means of the LCA methodology is undoubtedly an important step forward for the Mapei Group towards the design of products and solutions with less impact on the environment aimed at reducing the share of greenhouse gas emissions associated with the building industry. Research is focusing specifically on optimising long-lasting high-quality products that also cause less environmental impact, reducing the concept of waste to a minimum to eliminate as much of it as possible.

Corporate Environmental Sustainability Group Leader

by **Cameron Bellman**

Constantly striving for excellence

MAPEI CAN PLAY A KEY ROLE IN THE PROCESSES OF CHANGE REQUIRED BY THE BUILDING INDUSTRY

What are the challenges facing the concrete industry in the near and long-term future?
I would suggest the greatest challenge being that of sustainability. Like in all other aspects of our lives, reducing CO_2 emissions within the cement and concrete industry, I believe, is the greatest challenge. The cement industry aims to be carbon neutral by 2050 and this will inevitably lead to changes in the way cements perform. With concrete remaining the world's most utilised construction medium, ensuring it meets the increasing performance criteria of today's and tomorrow's structures, whilst overcoming changes in cement composition, will challenge concrete and admixtures producers alike.

How can Mapei help them meet the challenges lying ahead?
The changes ahead in the industry will undoubtedly increase the need for chemistry to help producers meet the performance demands of concretes with different cements. Mapei can play a key role in the industry as it develops and changes. Focused Research & Development aligned with excellence in customer and market engagement are the success factors for the Group.

How can Mapei contribute to the growing issue of a shortage of natural materials to be used in manufacturing processes?
With the availability of naturally occurring sands and gravels becoming increasingly scarce and demolition waste no longer being able to be put in landfills, the usage of manufactured or recycled materials is set to increase. Mapei has had the foresight to develop a range of products, the RE-CON Line, that offers solution to the management of returned/waste concrete and, through the RE-CON AGG products, facilitates the production of concrete that contains fractions of recycled aggregates from demolition waste concrete of and manufactured sands.
In preparation of the changes within the industry and the challenges it faces through raw material changes and availability, Mapei has developed the CUBE System. This novel approach allows concrete producers to utilise both cements with reduced clinker content and recycled or manufactured aggregates, without impacting the concrete plastic and hardened properties when compared to a control mix based on OPC (Ordinary Portland Cement) and natural aggregates.

What distinguishes what Mapei has to offer from its competitors?
Like all businesses and industries, we work in a competitive environment where at product level it can be difficult to differentiate. Our point of difference comes from our excellent people who support our customers at all phases of their business.

What are Mapei's development plans worldwide as regards products for the concrete industry?
The concrete industry is a focus sector for the organisation, and we have a clear determination to grow our global share. Mapei's approach of providing solutions to customers' challenges through product and excellent technical and customer support, suits the concrete industry. So, we feel we are a good fit to the industry. We expect to grow globally and this is reflected in the Group's subsidiaries currently expanding their admixture business, such as those in Australia, the United States, Vietnam and the UK.

What kind of human resources are focused on the growth of this line?
Our people are key to the success of this business and we continue to build on our existing strong team by adding experience and expertise throughout the concrete admixture community.

Corporate Product Line Director, Concrete Admxitures, Mapei Group

ENHANCED CUSTOMER FOCUS WITH MANAGEMENT OF KEY ACCOUNTS AT MAPEI

by **André Walliser**

NEW HUMAN RESOURCES AT THE SERVICE OF PEOPLE WORKING IN THE CONCRETE INDUSTRY

Mapei's product line 'Concrete Admixtures' has recently set a new role for Corporate Key Account Management to work more closely with major clients.
Mapei's ultimate vision is to

- create a value-adding process steered from a corporate position;
- implement extensive coordination within Mapei to advocate for specific strategic accounts;
- provide long-term mutual benefits for key clients and our product lines.

We define Key Account Management (KAM) as a process of inter-organizational cooperation that creates value for strategically relevant clients and for the company. The development of client-tailored proposals will secure long-term business. Corporate Key Account Manager (CKAM) coordinates the deployment of multi-functional resources across Mapei's organization and follow-through at all levels.

How it works: modus operandi
Mapei is creating sustainable products for the construction industry and CKAM will demonstrate this by:

- connecting Mapei Group experts with strategic account partners at multiple levels to build relationships with decision makers;
- conducting and coordinating exchange of best practice and unique references;
- identifying technical innovation and business opportunities.

A major aim of CKAM is to support the generation of sales and business development. To achieve this, CKAM closely works with local Mapei experts and sales teams to pull the appropriate clients' levers: from research, purchasing to global technology transfer and technical performance.

Ambitions and values for customers
One of Mapei's ultimate aims is to create long-term, sustainable value for our strategic clients. Indeed, according to Gallup, 71% of B2B clients feel disengaged from their suppliers while the companies most successful at overcoming our last major financial crisis were those that invested in their strategic accounts. Outperformers following a downturn are generating 17% more in total returns by investing in growth and innovation.
This can be achieved with joint market initiatives and sharing best practices. Initiatives to accelerate the transfer and implementation of global technologies and innovations will also connect major actors and boost creativity. CKAM leads activities to position trust as a means of gaining a competitive edge, offering bespoke contact within the Mapei Group and inspiring absolute trust in the whole organization.

Corporate Key Account Manager, Concrete Admixtures, Mapei Group

TRUST GENERATION BY CKAM

Mapei Corporate Key Account Managers' work is inspired by:

Reliability: A Corporate Key Account Manager is someone who can be counted on, able to make commitments and follow through.

Credibility: Bringing value to the table and the sustainability challenges facing the industry

Connection: Building relationships with clients, learn from them, find out what truly matters to them and help them get it.

by **Matteo Magistri**

The cement industry: the challenges of the future

CO_2 EMISSIONS CAN BE REDUCED BY USING ADDITIVES AND ADOPTING THE CORRECT APPROACH TO INNOVATION

Thanks to an unique combination of high mechanical performance, durability, ease of use, wide availability of raw materials, good possibility of properties modification and relatively low cost, concrete is the most common construction material in the world and the second most used after water. The active ingredient of concrete is Portland cement, and the active ingredient of Portland cement is Portland clinker: an artificial blend of calcium silicates and silico-aluminates that can react with water and, thanks to this hydraulic reaction, hardens and transforms the fluid mix of cement and water into a solid mass, binding together fine and coarse aggregates.
The typical manufacturing process of Portland cement (see figure 1) starts with the extraction of raw materials, mainly limestone and clay, that are quarried and properly blended and ground to prepare the so-called raw mix. This is fired in a special kiln in a high temperature process where silica and lime (with alumina/iron oxides added to raw mix to improve process efficiency) react to form the calcium silicates and aluminates that compose the Portland clinker.
Clinker is then finely ground together with gypsum and secondary mineral additions (such as limestone, fly ash, granulated blast furnace slag, natural or artificial pozzolans) to obtain the well-known grey powder usually referred to as Portland cement, used by millions of construction workers as hydraulic binder in concrete.

Reducing greenhouse gases to make production more sustainable

Cement manufacturing is a typical heavy industry process characterized by a high energy demand due to both fuels needed to reach the high temperature required and the electrical energy that drives the grinding mills and all the machinery of a modern cement plant. Moreover, during clinker production limestone (natural calcium carbonate) is decomposed and releases in the atmosphere relevant quantities of carbon dioxide. The result is that cement industry is reported to be responsible for 5%-8% of total anthropogenic greenhouse gas emissions, mainly associated to clinker production and grinding. The table on top of the page summarizes modern data about CO_2 emissions in cement

CO_2 EMISSIONS FROM CEMENT/CONCRETE INDUSTRY

Direct CO_2 emissions associated to clinker production	0.84 t CO_2/t clinker	Data from 19% cement plants worldwide
Average clinker factor in cements	0.65	Strong local differences (average Europe: 0.74 - Ireland, Denmark: 0.9 – Germany: 0.71 - Netherland: 0.46)
Direct CO_2 emissions associated to cement production	0.54 t CO_2/t cement	Considering average clinker factor
Total specific electric energy consumption for cement production	100-110 kWh/t cement	Corresponding to 50-55 kg CO_2/t cement (considering energy mix with 0.5 kg CO_2/kWh)
Concrete emissions	Non reinforced: 250 kg CO_{2eq}/m^3 Reinforced: 312 kg CO_{2eq}/m^3	Considering typical C30/C37 ready mix concrete

STRATEGIES FOR REDUCTION OF CO_2 EMISSIONS

Improvement in thermal energy efficiency of clinker production	Limited potential: already reached the state of the art
Use of alternative fuels	Average substitution range in Europe: 41% (100% reported in some plants). Good potential, limited to availability of suitable waste
Reduction of clinker factor	Good potential for CO_2 reduction. Related to local and global availability of Secondary Cementitious Materials. Need to improve blended cements performance
Alternative cements: CSA, geopolymers, belite	Potentially high reduction of CO_2, but high raw materials/investment cost and limited applicability
Improve electrical energy efficiency	Limited potential
CCS/U – Carbon Capture and Storage: the process of capturing CO_2 emitted from industrial plant before it is emitted in the atmosphere and storing or reuse it	Theoretically extremely high or complete reduction of CO_2. Presently at pilot plant stage (although long term experience exists in oil sector). First operative industrial CCS forecast for 2024-2030 in Norway

Source: M. Schneider, "The cement industry on the way to a low-carbon future", ICCC2019, Prague.

THE CEMENT MANUFACTURING PROCESS

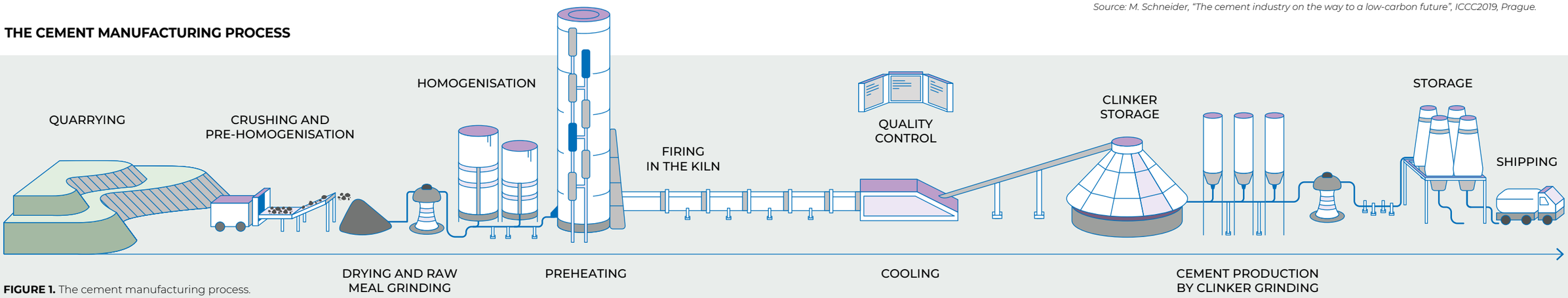
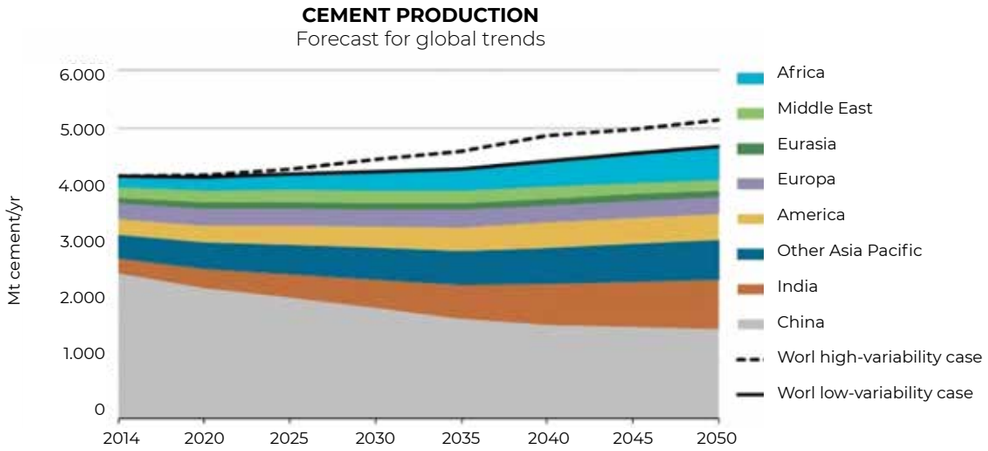


FIGURE 1. The cement manufacturing process.



Source: IEA/CSI Technology Roadmap – Low-Carbon transition in the cement industry

and concrete production, while in the table at the bottom of the previous page main strategies that can be implemented for the reduction of emissions are briefly described and commented. The graph above reports a forecast of the global cement production until 2050, that is supposed to reach 5 billion tons.

Having this in mind, it appears that the reduction or elimination of CO_2 emissions is a serious challenge for the cement industry, and the more promising strategy is the reduction of the quantity of clinker contained in cement.

Blended cements (cements where clinker is partially substituted with other materials) are not a novelty: their production and use have been a common industrial practice for a long time and the use of secondary cementitious materials such as limestone, fly ash, slag, natural or artificial pozzolans is well known and described in technical standards. On the other hand, the reduction of the clinker factor that is now required is far beyond any level the building industry has previously been accustomed to.

To face this challenge, new technical standards have recently been released (for example the European standards EN 197-5 and EN 197-6), describing the production of new cement types (named CEM II/C and CEM VI) with very low clinker content. Moreover, new types of secondary cementitious materials and their combination with traditional ones are being investigated and developed, and in some cases they are already available on the market. A typical example is represented by calcined clays and calcined clays/limestone combination: this will probably have the highest potential for significant clinker reduction.

Low clinker cements present however some issues, mainly reduced early strength and increased water demand.

First of all, the reduction in the active ingredient (the clinker) limits the mechanical performance that can be reached. Second, some cementitious materials often absorb a significant amount of water, increasing the initial viscosity of fresh concrete. It is then mandatory to correct strength and water demand using suitable cement additives: these are chemical products that influence the cement hydration accelerating the strength increase and improving the viscosity that the cement will have once used in concrete. Moreover, these additives also work as grinding aids, increasing the output of grinding mills in cement plants, and reducing the specific energy consumption.

Cement additives can be tailor made according to the required targets and to the type of cement/clinker, considering its chemistry and mineralogy. They are commonly used as process additives, usually added to cement during grinding: this usually turns into indirect CO_2 savings, that can be more or less evident depending on the energy mix used to generate electricity. The cement produced, thanks to the improved early hydration and the reduced water demand guaranteed by the presence of additive, can have higher clinker substitution, with remarkable reduction of greenhouse gas emissions.

The global cement industry is going to be subjected to a change that never happened before, but with the correct approach to innovation there are good possibilities to succeed.

Cement additives: Frequently Asked Questions

What are cement additives?
Cement additives, also known as grinding aids, are chemical products used during manufacturing process of modern Portland cements. They are usually added directly in the mill during the grinding of clinker, gypsum and secondary cementitious materials.

Why grinding aids are used?
Grinding aids are mainly used to increase the efficacy of the production process. This means to produce a higher amount of cement with the same energy consumption, or to produce a finer and more reactive cement.
Moreover, modern cement additives also play a role in performance enhancement from a chemical point of view: during cement hydration (the complex series of chemical reactions that take place when cement is mixed with water, bringing to hardening and mechanical strength development) the presence of cement additives modifies the reactivity and allows reaching higher strength, or better control of hardening kinetics, or reduced water demand.

Grinding aid and cement additive are synonyms?
Basically yes, because modern products available in the market acts both as grinding efficiency improvers and as cement performance enhancers.

What are typical dosages of cement additives?
Typical dosages lie in the range 200-300 grams to 2-3 kilograms per ton of cement.

Which is their mechanism of action?
Cement grinding (as it happens in many other grinding operations) is a low efficiency process: only a minor part of the energy used (measured in kilowatt-hour – kWh) is actually converted to cement fineness increase. A relevant part of this energy is wasted in form of heat. This happens because as fineness increases, there are agglomeration phenomena of fines particles that reduce the overall efficiency of the process. Cement additives allow to control and reduce this agglomeration. This pushes the hourly mill production and the fineness that can be reached, with the same energy consumption.

What product lines are available?
For more than twenty years, Mapei has been placing on the market two lines of cement additives: MA.G.A. (Mapei Grinding Aids) and MA.P.E. (Mapei Performance Enhancer). These products are often formulated according to the requirement of specific cement plants.

Can we calculate the reduction in the CO_2 emissions obtained using cement additives?
It can be estimated that for each ton of cement produced with the use of cement additive, there is a 20 kg CO_2 reduction with respect to the same cement produced without additive. This calculation considers an average additive dosage of 350 g/t, a 25% mill production increase, and a 2% clinker reduction in cement composition. It is also based on a 0.57 kg CO_2/kWh energy mix and on 862 kg CO_2 per ton of clinker produced. For a medium size cement plant, this corresponds to a reduction in the range of some tens of million kg CO_2 every year.

Matteo Magistri. R&D Manager, Cement Additives Division, Mapei SpA (Italy)

by **Marco Paparella**

Synthetic fibers for strengthening concrete

THEY ARE USED TO REPLACE METAL REINFORCEMENT

Amongst the various components required for the formulation of sustainable concrete, a far from insignificant contribution may be attributed to the use of synthetic fibers as a substitute for traditional metal reinforcement. Mapei is the leading manufacturer of polymeric structural fibers for concrete in Italy and one of the leading companies in Europe. The manufacturing plant in San Cesario sul Panaro in the Province of Modena (Central Italy) produces all the types of structural synthetic fibers required for the MAPEFIBRE line, with diversified characteristics in relation to the application required.
Apart from improving the mechanical properties of concrete, synthetic fibers improve its durability, ductility and fatigue behaviour and guarantee a reduction in CO_2 emissions in various applications.

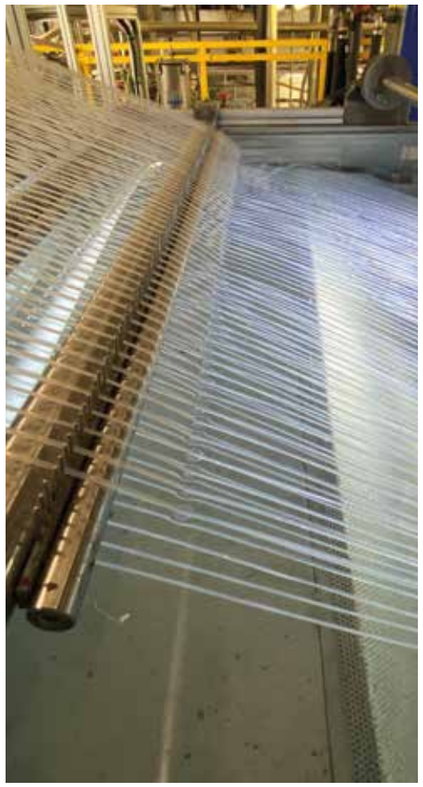
Fibers: a sustainable technology
There are numerous reasons why synthetic fibers are sustainable technology. Synthetic fibers are manufactured by melting granules of different types of polymers together and then extruding filaments in differing forms and with different mechanical characteristics, during which all waste is collected and recycled. Because all waste material from the production process is constantly collected and recycled, the production of synthetic fibers is classified as a "zero-waste" process.
Besides, the application of fibre-reinforced concrete has a far more reduced impact on the environment, if compared with traditional reinforcement. In fact, synthetic fibers are added directly to the concrete mix, thereby eliminating all the installation phases associated with classic metal mesh which, apart from having to be transported to site and then handled on site, also requires the use of other materials to position the mesh correctly and calls for longer site operation times.
Eliminating transport and the application of metal mesh leads to the first, enormous reduction of CO_2 emissions.
In addition, far lower dosage rates of synthetic fibers are required than with steel fibers, the reason why they guarantee a considerable saving in site materials and a reduction in CO_2 emissions.
All the fibers produced by Mapei come with an EPD (Environmental Product Declaration) compliant with international standards (ISO 14025, EN 15804) that document the impact they have on the environment throughout their life cycle.
As synthetic fibers contribute to the formulation of more sustainable concrete, Mapei has continued to invest in this technology, acquiring a new manufacturing facility in 2022 in San Cesario sul Panaro and adding two new production lines.
One of the areas of application in which synthetic fibers are most highly appreciated and adopted is industrial flooring, a sector for which Mapei has its own dedicated structure, CFS (Concrete Flooring Solutions), along with a portfolio of products and services for fibre-reinforced concrete floorings.

MAPEI: PLATINUM SPONSOR AT FIB 2022 IN OSLO

This year the International Congress organized by FIB (Concrete International Federation) was held in Oslo (Norway) from the 12th to the 16th of June and was strongly driven by the need to introduce innovation in the concrete sector to meet ambitious global objectives for a sustainable society.
Amongst the main topics at the event, market leading companies and sector experts discussed new ways of saving energy and reducing CO_2 emissions, the use of recycled materials in construction processes, new, more efficient and smart design practices, better performing structures with less impact on the environment and the disposal and recycling of modular precast concrete structures.
Beside supporting the event as Platinum Partner, Mapei presented its innovative solutions for concrete such as the RE-CON line, the Cube System and the MAPEFIBRE lines of synthetic fibers.

Marco Paparella, Matteo Draconte. Fibers Line, Mapei Group

LEFT and RIGHT.
The MAPEFIBRE line includes several types of structural synthetic fibers with diversified characteristics for different applications.



LEFT. The extrusion process is used to produce synthetic fibers at the Mapei manufacturing facility in San Cesario Sul Panaro in the Province of Modena (Italy).
RIGHT and BELOW. An example of concrete industrial flooring strengthened with synthetic fibers for the Docks logistic centre in Serravalle Scrivia (Italy).

by **Gianluca Bianchin**

An integrated approach

THE CUBE SYSTEM ACTIVELY HELPS THE CONCRETE INDUSTRY MAINTAIN ITS HIGH STANDARDS WHILE REDUCING THE ENVIRONMENTAL IMPACT

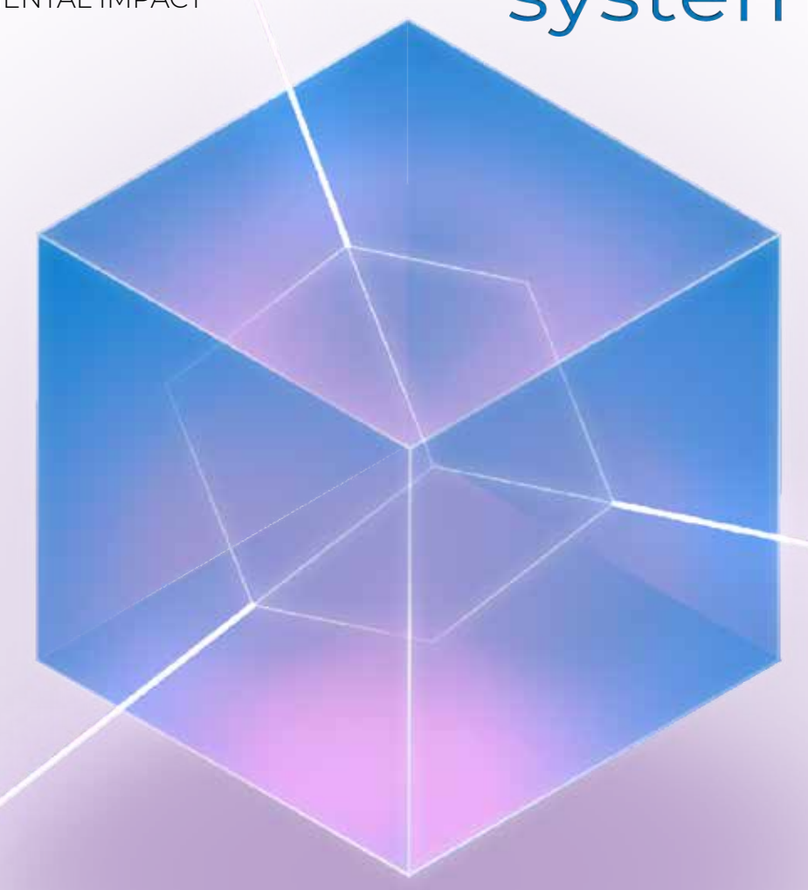
The use of cement with lower clinker content and recycled aggregates in concrete production presents several challenges for the concrete industry. The complexity of this challenge is increased further due to the regionality of the raw materials (sand and gravel) used in the production process. Mapei has developed the CUBE System: an integrated approach that helps the concrete industry overcome the difficulties of reduced clinker cements and aggregates of varying quality through the various phases of production, casting and on-site work. The CUBE System actively helps the industry maintain its high standards while reducing the environmental impact. It helps the concrete market become more sustainable by supplying products, technologies and tools: a line of cutting-edge superplasticizers; strength enhancers for the new cements with reduced clinker content; a complete proposal of hardware and software for monitoring the quality control of concrete.

New generation **admixtures**

DYNAMON CUBE is the new line of superplasticizers specifically designed to face the challenges of sustainable concrete. They make use of polymers designed to work with CEM III, CEM IV and CEM V and any kind of SCM; recycled aggregates such as special absorption inhibitors (RE-CON AGG Technology); and specific gradual-release polymers guaranteeing that workability and low viscosity are maintained for longer times without delaying the setting phase.

Strength **enhancers**

The MAPECUBE line is the new generation of admixtures for the new cements with reduced clinker content and lower carbon footprint. It makes use of technologies based on nano-composites of silicate hydrates which promote Secondary Nucleation (SN), Augmented Pozzolanic Reaction (APO) and Alkaline activation (AA). They ensure a more rapid and extended hydration reactions and better development of the microstructure of the cement pastes and enable the development of higher mechanical strength both in short and long term.



CUBE system

Advanced monitoring: from production to delivery

Good work requires good tools. The tools now available at Mapei CIS (Concrete Industry Solutions) are used to achieve results in a faster and safer way. How is this done and is there an example to prove these statements? The answer lies in the principle of using facts and data in the development, implementation and delivery of new sustainable mix designs. The data are collected from sensors placed at critical points in the production chain from raw material moisture to the monitoring of the concrete being delivered to the building site. The data are then analyzed in specially designed software. This automated process radically shortens the time needed to develop, test and evaluate new mix designs. It also greatly improves the quality control process of production and delivery.
A very good example of the tools and solutions offered by Mapei CIS is the ED SM II system. By joining forces in 2020, the combination of competence of the two companies Elettrondata and Mapei (see *Realtà Mapei International* no. 87) resulted in an upgraded version of the ED SM monitoring system that enable the monitoring of the workability and rheological characteristics of concrete, not only in the concrete plant itself, but also from the plant and throughout its journey right up to the delivery point where the concrete is to be used, and where the rheology is key to achieving durability in concrete structures. Factual conditions supported by real-time data enhance the Quality Control and increases the confidence of concrete producers and end users to use new, more sustainable concrete mixes. In other words, the ED SM II system increases the predictability of delivered concrete, which is crucial for the success of implementing new types of concrete.

CIS

Find out more CONCRETE INDUSTRY SOLUTIONS

Region Manager, Concrete Admixtures & Project Manager, Cube System, Mapei Group

by **Francesco Surico**

Objective durability

REINFORCED CONCRETE SHOULD BE DESIGNED THINKING ABOUT ITS CAPACITY TO MITIGATE THE RISK OF DETERIORATION

Apart from all the measures that can be taken to make concrete more sustainable, such as working on its constituent components and reducing energy consumption, to achieve sustainability across the whole chain, we cannot overlook considering the service life of a structure.
This means that reinforced concrete is now designed not only with regard to its mechanical characteristics and properties at the fresh state, but also thinking about its ability to maintain these characteristics over time.
And whether they are infrastructures or civil works, they are increasingly conceived to minimise maintenance costs and downtimes and to stop them becoming obsolete for as long as possible.
To get a clearer picture of the fundamental importance of this aspect, let's think about the number of resources and energy required, for example, to shut down a motorway tunnel and carry out work quickly, including during the night shift, to make it safe and restore its functionality.
There is an extensive range of possible remedies available which may be specified, starting from the technical solutions proposed, but first we need to take a step backwards to understand exactly what could potentially undermine the durability of a reinforced concrete structure.
A reinforced concrete structure is essentially made up of an interconnected network of carbon steel reinforcement embedded in concrete. The concrete gives the structure its required compressive strength and protects the steel reinforcement from the type of corrosion it inherently suffers from in the presence of oxygen and/or particularly aggressive elements, such as chlorides.
Concrete – which, in turn, is made of cement, water and stone aggregates – is a porous material that, inevitably, allows the ingress of gases and liquids that chemically modify its matrix and transport potentially aggressive agents, leading to corrosion of the steel and, as a result, compromising its mechanical properties.

The Panama Canal: an imposing project for which Mapei supplied admixtures (such as DYNAMON XP2 and DYNAMON XP2 EVOLUTION) to reduce the water/cement ratio and increase the durability of concrete. This contributed to its estimated design life of 150 years.

Mapei proposals to counteract the deterioration

To mitigate and slow down these phenomena, Mapei is focused on the supply of innovative solutions across various sectors developed for the specific needs of concrete manufacturers and construction companies.
The first element that can be improved when designing durable concrete is the porosity of the cementitious matrix, by calibrating, first and foremost, its water/cement (w/c) ratio. Basically, the lower the amount of water added to the conglomerate, the lower its porosity and, as a result, apart from having better mechanical properties, a structure less permeable to pollutants will be obtained. To obtain a lower w/c ratio, super-plasticising admixtures, particularly those from the DYNAMON family, have been for years a formidable tool which is now essential for the modern construction industry.
Another class of products that operate by reducing porosity are the so-called supplementary cementitious materials (SCM), such as fly-ash, Pozzolan, ground granulated blast-furnace slag (GGBS) and silica fume. These admixtures consume the lime produced as a by-product of the hydration reaction of Portland cement and transform it into compact structures that improve the strength and impermeability of the cementitious matrix. In this case, admixtures from the MAPEPLAST PZ family are successfully used.
Creating a physical barrier against the penetration of pathogenic agents is also the basic mechanism behind the way crystalline waterproofing admixtures function, such as IDROCRETE KR 1000 for example, that turns into a filler directly within the capillary pores and slows down the diffusion of liquids and gases within the structure significantly.
Mass hydrophobic admixtures, on the other hand, are designed to reduce the amount of water absorbed by the structure, making the cementitious surface water-repellent and, therefore, more waterproof. This prevents the ingress of potentially corrosive substances dissolved in water.
Looking at things from another angle, Mapei has also developed solutions that focus on inhibiting corrosion reactions by operating directly on the steel reinforcement. In this case we are talking about corrosion inhibitors: MAPESHIELD products operate by passivating the surface of the steel and delay the onset of corrosion caused by chlorides and considerably reduces the speed at which it spreads. Moreover, MAPESHIELD I makes use of a highly effective system: cathodic protection, which inhibits corrosion, including in existing structures, and even in those cases where corrosion has already been triggered (see *Realtà Mapei International* no. 92).

Group Leader, R&D Concrete Admixtures, Mapei Group

A few Mapei solutions for a durable concrete

Dynamon Xtend W400 N
This acrylic super-plasticizer, which was used for the concrete used for the San Giorgio Bridge in Genova, is formulated to produce concrete with a low water/cement ratio and a good retention of workability.

Mapeplast PZ300
Special mineral admixture based on micronized powders for mass concrete.

Idrocrete KR 1000
Crystallizing admixture for waterproof concrete.

Idrocrete DM
Integral water repellent admixture for cementitious mixtures that significantly reduces the absorption of water in hardened concrete and prevents efflorescences.

Mapeshield I
Pure zinc anodes coated with a special conductive paste, for galvanic cathodic protection against corrosion of reinforcement rods in new structures and in structures requiring repair.

by **Sven-Henrik Norman**

Mapei technology transforms waste into a resource material

THE RE-CON LINE SOLUTIONS HELP MANAGE AND RECYCLE CONCRETE AND WASHING SLURRY

The rising cost of fuel and virgin raw materials has caused an increase in the total cost of ready mix concrete production in recent years. These costs have even accelerated during and after the Covid-19 pandemic due to disturbances in global logistics and raw material supply chains. In combination with the increasing awareness in society about the need for more circular production models, the management of waste streams in concrete production has come into the spotlight as a major cost and environmental issue. Returned concrete and slurry from washing of trucks, which previously could be disposed at low cost, is now becoming more and more expensive to handle.
Mapei has worked on this issue for many years and can offer products and solutions that transform returned concrete and washing slurry into resource materials. The Mapei RE-CON line helps concrete producers to reduce the use of water and raw materials like sand, aggregates and cement, while also reducing water pollution.

The Re-Con line circular process
The RE-CON line of products helps concrete producers become sustainable by offering solutions that transform, reduce and recycle waste streams. A 50.000 m^3 yearly production normally has a rate of returned concrete of 5%, i.e., 2500 m^3 or approximately 5800 tons. It also has a waste stream of washing slurry. If there is no possibility to re-use the returned concrete, it will have to go to landfill as waste. The slurry must in any case be deposited in landfill or in an approved deposit as it contains heavy metal contamination like hexavalent chrome. The cost of this handling can be tens of thousands of Euros for the production in this example.
If the RE-CON line solutions are applied in concrete production, substantial savings can be achieved.
Not only are handling costs eliminated with the Re-Con Line solutions. The transformation of the waste materials into recyclable aggregates also leads to savings by reducing the need for virgin raw materials.

RE-CON zero EVO

Transforming returned concrete into aggregates

Since concrete generally needs to be used within 1-4 hours from the mixing, over-ordering and quality issues can result in a daily flow of tens of cubic metres of concrete back to a single mixing plant, a waste stream that requires significant resources, time and costs to handle and in many cases transport it to landfill. Mapei revolutionized the handling of returned concrete with the introduction of RE-CON ZERO in 2010. Returned concrete can now be transformed into a recyclable aggregate material. The transformation happens thanks to a patented 2-part system including a superabsorbent polymer and a hardener. The water in the concrete is bound by the superabsorbent and the hardener accelerates and stabilizes the process. The returned concrete can be transformed in the truck mixer or in a separate process if the truck is needed quickly for a new job. The result is a recycled aggregate can be used in new concrete or sold as backfill material, leading to substantial savings in handling costs. The aggregates can also be used in an intermediate process of absorbing truck washing slurry in the RE-CON DRY WASHING process.

RE-CON DRY WASHING

Cleaner water and reduced waste from concrete trucks with RE-CON DRY WASHING

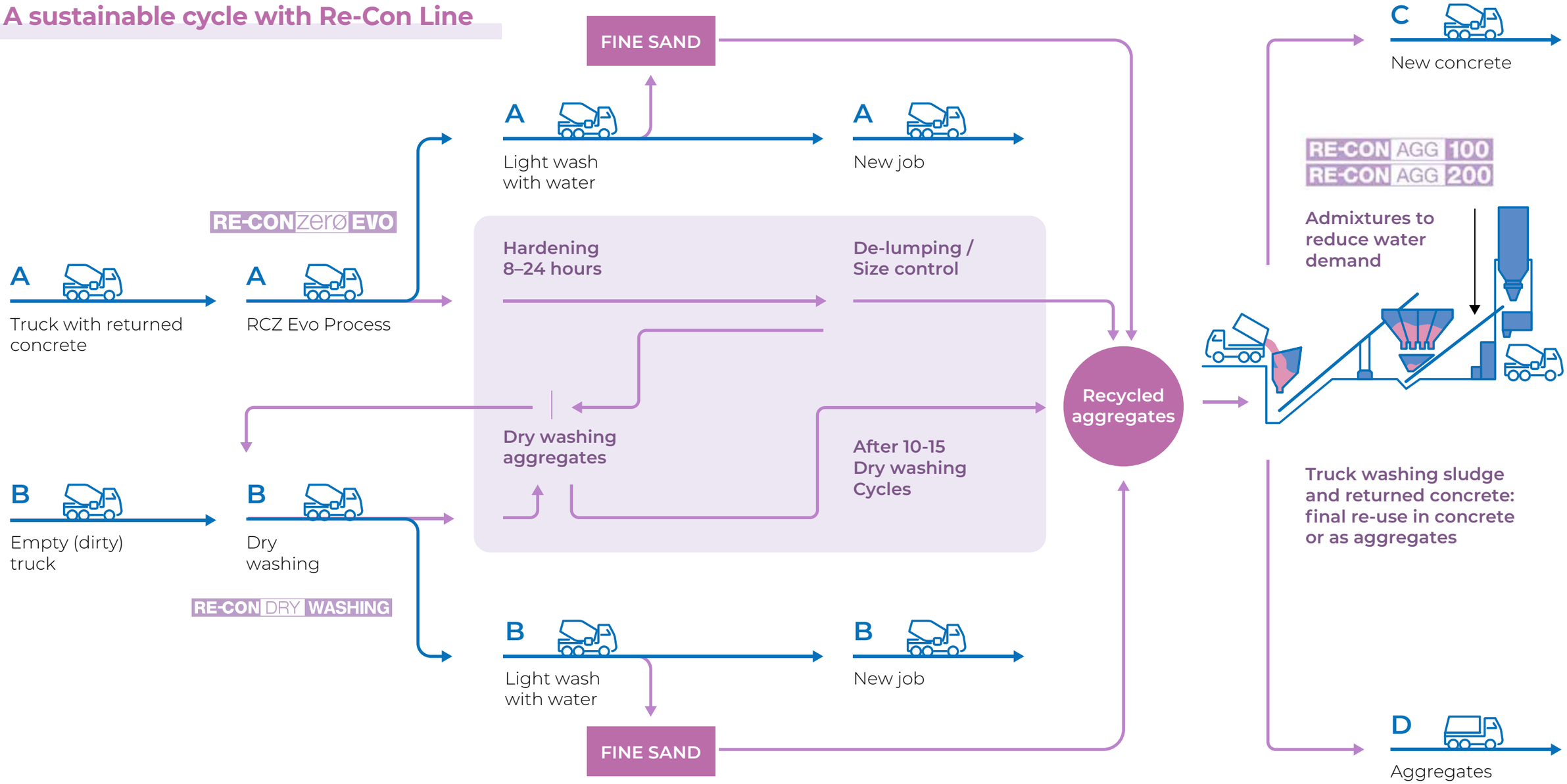
The RE-CON DRY WASHING method was invented by Mapei in 2019. It greatly reduces washing slurry waste and washing water consumption from concrete trucks by using the absorbing properties of the RE-CON ZERO EVO aggregates made from transformed returned concrete. The method makes it possible recycle washing slurry into a recycled aggregate, instead of having to process, transport and deposit it at landfills. Much less water is needed to complete the cleaning of the truck mixing drum after it has been dry washed.
The residual washing water has a lower solids content, lower pH and a lower risk of containing heavy metals like hexavalent chrome. All this is due to the unique absorption of cementitious residue onto the dry washing aggregates. And there is one more advantage: Mapei analysed and tested the Dry Washing aggregates together with the renowned research institute SINTEF in Norway and discovered that the Re-Con Dry washing particles absorb carbon dioxide through the process of carbonation. The RE-CON Line offers unique possibilities to produce carbon negative aggregate materials and Mapei Research continues in this field.

RE-CON AGG 100
RE-CON AGG 200

Reducing water and cement when using demanding materials in concrete with RE-CON AGG admixtures

There is a growing need to shift to use more recycled materials and to utilise manufactured sand and lower quality sands in higher ratios in concrete production. Recycled aggregates generally have a higher water absorption due to their porous surface structure. Manufactured sands with high fines content and low-quality sands containing clay minerals can cause a higher water consumption in concrete mixing. With a high water demand, a higher usage of cement automatically follows, since the water/cement ratio is dictated through industry standards. With the help of the RE-CON AGG admixtures, increased ratios of water demanding sand and aggregates can be used without increasing the need for cement. The RE-CON AGG polymers block the porous surfaces and crystalline structures in demanding aggregates and sand from absorbing the mixing water from the concrete in its fresh state. Instead of getting soaked up into the porosities or laminar mineral layers of the sand or aggregates, the mixing water stays available in the fresh concrete, keeping it flowable for much longer than it would have been without these admixtures. The alternative would have been to add more water and more cement to the mix, leading to higher costs and a bigger carbon footprint.

A sustainable cycle with Re-Con Line



The process is best described in this flow diagram. There are two alternatives for the trucks that return back from a delivery at a building site to the batching plant. Either it contains some returned concrete **(A)**, or it is empty of concrete but has about 200 kg of cementitious residue that covers the inside of the mixer drum in a thin layer **(B).** In Case **A,** the returned concrete is treated with the RE-CON ZERO EVO process which transforms the fresh returned concrete into a granular material that is emptied on the ground and left to dry and harden for 8-24 hours. After this, the truck can take a light wash and is then available for the next job. For the concrete truck driver, the process has taken about 15 minutes and instead of a flow of concrete that needs to be handled and processed, the batching plant now has an available volume of aggregates. This material is called Re-Con Zero aggregates and it can either be sold as a base course or backfill material, re-used in the production of new concrete or as a Dry Washing aggregate in Flow Case **B**. When a truck returns as empty but dirty **(B)** it goes directly to do the RE-CON DRY WASHING process. Approximately 1 m^3 of aggregates, or 2500 kg is fed into the empty truck and is rotated back and forth inside the drum for about 4 minutes. During this rotation, the aggregates clean the inside of the drum and absorbs around 70% of the cementitious residue onto the surface aggregates, forming a new layer that will dry and harden in 12-24 hours. The truck empties the aggregates in a material storage unit and can then have a light wash where the remaining residue in the form of fine sand with a minor element of cement is collected for sedimentation and dewatering.

The need to dry wash an empty truck varies from case to case. Normally it is only needed after the last load of the day. But in a hot climate or in special cases, concrete trucks have to be cleaned also during the day between deliveries. The dry washing aggregates can be re-used for about 10-15 times before its slurry absorbing abilities are no longer efficient enough. It is then used in process step **(C)** as replacement for virgin raw materials in new concrete or in **(D)** where it is sold externally as aggregates. In step **(C)** the use of Re-Con AGG admixtures can save a lot of water and thereby cement, by keeping the concrete made with recycled aggregates flowable for a longer time after mixing.

Corporate Product Manager, Re-Con Line, Mapei Group

Re-Con Dry Washing process: from cleaning to reuse washing slurry

TWO CONCRETE MANUFACTURERS TELL US ABOUT THE ADVANTAGES OF AN INNOVATIVE CLEANING PROCESS DEVELOPED BY MAPEI

RIGHT. The RE-CON DRY WASHING process starts when the concrete truck comes back to the plant after delivering concrete. A hopper feeds aggregates onto the conveyor belt that feeds it into the concrete truck which is rotated at high-speed.
BELOW. The aggregates resulting from the RE-CON DRY WASHING process can be used to produce new concrete.

RE-CON DRY WASHING

In Scandinavia, the RE-CON DRY WASHING process, invented by Mapei, has been in use since 2019. Mapei was awarded the 2020 Innovation of Year Award in the Norwegian Building Industry for this innovation, which is unique in the world. Two customers kindly agreed to be interviewed for this special edition of *Realtà Mapei International*. Let them share with us their view on this new method for washing concrete trucks.

In Norway with Ølen betong

First, we take the journey to the west coast of Norway, where the company Ølen betong is operating one of their many ready-mix plants. They were the first customer to start using the RE-CON DRY WASHING method in close cooperation with Mapei's Sustainability team.
The process starts when the concrete truck comes back in the evening and is parked next to the hopper. The feed hopper feeds the dry-washing aggregate onto the conveyor belt that feeds it into the concrete truck which is rotated at high-speed. The aggregate absorbs the washing slurry inside the truck. The driver moves the truck to the materials storage unit and with the dry-washing material inside the drum rotates it forwards and backwards for a few minutes and then empties it into the storage unit. When it has dried for about 24 hours, the operator breaks it with the wheel loader and put it into another storage unit. Then the process starts over: the material is fed back into the hopper and continues the dry-washing process. If the weather is nice and dry, the process can be repeated if for several weeks. If it is rainy and wet, one needs to replace the material after 1 week. When the trucks have completed their work for the day and do their dry-washing process, the mixing trucks are much cleaner because much more of the washing slurry is caught than before. When the trucks have been dry washed, they only need a light wash and can be parked for the day.
Ølen betong's representatives claim: "When the aggregates are saturated, we use them to produce concrete blocks to make what we call "Lego blocks" which is a product we can sell out. In this way, we manage to recycle both concrete and slurry." The result speaks for itself: the Ølen betong plant today has very little washing slurry and the vast majority is transformed into recyclable aggregates and used for concrete block production on site. The company has set an ambitious target for this plant: "The goal is no doubt to reach 100% recycling. Everything we put in our concrete trucks should be used as a product in one form or another. We see lots of possibilities here. We have already been able to realize some of them and we are excited to see what we will be able to do in the future. There is no doubt that RE-CON DRY WASHING process helped us enormously tackling our problems with washing slurry. We can say: "It works!".

> **"Ølen betong's goal is to reach 100% recycling. The RE-CON DRY WASHING process helped a lot in tackling the problems of washing slurry**

IN SWEDEN WITH AB SYDSTEN AB

by **David Rhudin**

> **"The total investment is much less than if we had invested in a completely new concrete reclaiming system**

The company AB Sydsten operates a ready-mix plant that has been using the RE-CON DRY WASHING method since 2021. Together with Mapei, a Road Map for 100% elimination of washing slurry has been designed and is under implementation. We asked David Rhudin, Business Area Manager for concrete at AB Sydsten, to share his thoughts on the RE-CON DRY WASHING method.
"We have seen many advantages with this method," so Rhudin claims. "The water consumption is greatly reduced and the water that we do get from washing the trucks with our new high-pressure system is much cleaner than before, even if we use less water for each truck. The washing water basically contains only sand so it sediments much quicker than before. This way we can recycle the water easier in the washing system and we are preparing to start to use it for washing the concrete mixer as well.

Can you say something about the economic aspect of this method?
The method does require some investment in storage units, crusher bucket and the high-pressure washing lance, that is a fact. But the total investment is much less than if we had invested in a completely new concrete reclaiming system.

How about the operating costs?
The main cost is the daily handling of the material with the wheel loader. This requires 2-3 hours per day and is of course a relatively high cost.

With this in mind, where is the break even for the Re-Con Dry Washing method?
Our calculations tell us that at approximately 100 Swedish krona (10 Euros) per ton of waste handling cost the RE-CON DRY WASHING method starts to save money for us, even when we include the depreciation of the equipment and operating cost.

What is the "secret" to your success? Do you plan to implement it in other plants of yours?
Zero waste, cleaner water and less water usage are the three aspects that makes this method a success. We can also save money compared to an ordinary washing plant, which makes the decision easy. The method in combination with producing and selling blocks from some of the returned concrete and used material from the dry washing process also generates an income, and this combination is very positive. Our plans for the future include the use of RE-CON DRY WASHING process at several other, or even all, of our other plants as soon as the "100% Recycling Road Map" that we are developing together with Mapei is realized. And we expect that to come in place very soon.

Business Area Manager for concrete, AB Sydsten

Pervious concrete floors with Re-Con Zero EVO

by **Giorgio Ferrari**

THE RIGHT SOLUTION TO WATERPROOFING URBAN SURFACES AND TACKLING THE RISK OF FLOODING

Pervious concrete paving is a valid answer to the problem of waterproofing surfaces in urban settings and the subsequent risk of flooding, which is occurring more and more frequently due to intense rainfall caused by climate change.
Pervious concrete is made from cement and coarse aggregates without sand, and it is characterised by 15% to 25% of voids to allow water to drain off, permitting a drainage rate of between 100 and 300 litres/minute per square metre. These characteristics allow rainwater to pass through relatively easily and filter into the ground, thereby replenishing the water table and preventing run-off into surface water bodies.
Pollutants are leached from surfaces and percolate into the ground where they are held to prevent them from polluting surface water bodies.

The heat island effect

In 2011 EPA, the United States Environmental Protection Agency, included pervious concrete in their list of Best Management Practices, or BMPs, for rainwater as an alternative to aerated ponds. Indeed, pervious paving helps mitigate the "heat island effect" that occurs in urban areas due to roofs and roads overheating (Fig. 1). The formation of heat islands contributes to the worsening of environmental conditions and an increase in energy consumption, especially during the summer. Pervious concrete paving helps reduce the "heat island" effect because, thanks to its porosity, it is cooler and allows water to evaporate, thereby mitigating the thermal effect caused by solar irradiation.
Special care must be taken during the placing and curing phases when creating traditional pervious paving. In fact, because of its low water/cement ratio (W/C≤ 0.35), the cementitious paste needs to form a tough bond with the aggregates, which makes pervious concrete particularly vulnerable to cracking phenomena during the drying phase. To prevent such problems, it is very important to take particular operational precautions (spraying with water, covering the concrete with anti-evaporation sheets, etc.), use a combination of aerating admixtures, viscosity modifiers and set-retardant admixtures and make use of skilled applicators. Until now, these limitations have slowed down the diffusion of this increasingly important and necessary type of application.

Owacon: innovation for pervious paving in Japan

A very recent innovation in this sector was introduced by Mr. Mitsuya Miyamoto, CEO of the Japanese company, Nagaoka-Ready Mix Co (see the interview below). Starting from normal, returned concrete treated with RE-CON ZERO EVO, it was possible to create pervious paving with similar mechanical characteristics and permeability as traditional pervious concrete.
This result was achieved thanks to the capacity of RE-CON ZERO EVO to cause the finer particles (sand and cement) and the mixing water to coagulate around the coarse aggregates in the concrete (photo 2). The result is the transformation of normal concrete into granules which, once placed in a layer around 10 – 15 cm thick and then compacted accordingly, fuse and weld together, leaving enough voids to allow water to pass through easily and quickly. Once it has set, concrete obtained using this process has the same properties as traditional pervious concrete. The advantage of this innovative approach is that normal concrete may be used without having to work with mix designs without fines and/or with an extremely low water/cement ratio. This latter aspect is particularly advantageous compared with traditional methods because it eliminates the risk of drying and cracking phenomena, which would otherwise require the adoption of particular countermeasures during the curing process. In fact, even if the granules produced using RE-CON ZERO EVO are apparently dry (photo 5), they contain all the water originally used to mix the concrete, which becomes available for the cement to hydrate correctly during the hardening phase.

R& Group Leader, HPSS -High Performance Sustainable Solution, Mapei Group

2. An image of a fresh granule obtained by treating normal returned concrete with RE-CON ZERO EVO. All the finer particles (cement and sand) and the mixing water have coagulated around the coarse aggregates.
3. Spreading the fresh granules on the ground.
4. Compacting the fresh granules with a roller.
5. Close-up of the finished pervious paving.

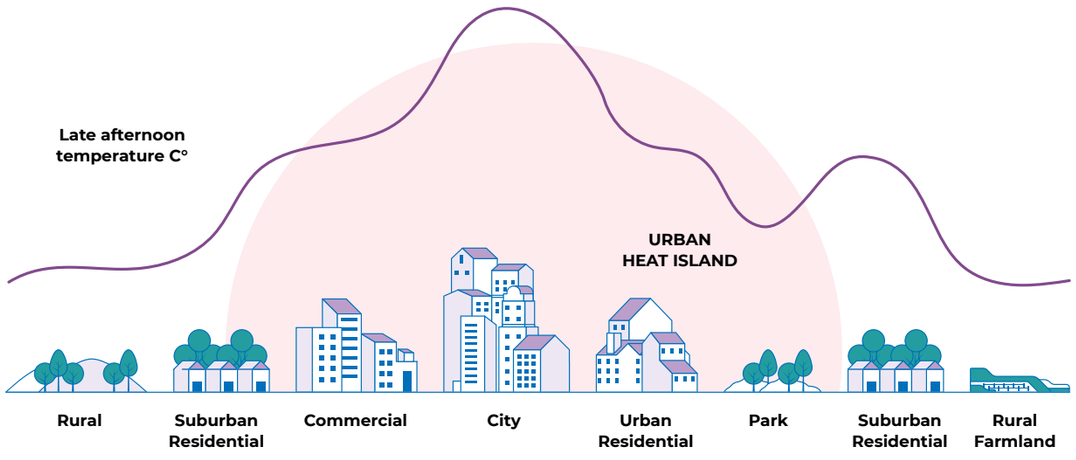


FIGURE 1. Heat island effect produced by overheating in urban areas. Source: WMO, World Meteorological Organization, hiips://community.wmo.int/activity-areas/urban/urban-heat-island.

OWACON: EASY AND ECONOMICAL

by **Mitsuya Miyamoto**

Are special tools and skilled labour required to make and place Owacon ?

Not at all. Any mixing plant can make concrete or take returned concrete and then transform it into Owacon using RE-CON ZERO EVO. No particular or special equipment is needed to place it.

How much does OWACON cost?

Owacon is cheaper than traditional pervious paving because, up to the moment of delivery, it is just normal concrete which is only transformed into Owacon in the mixer truck when it is actually placed. And it is even cheaper if returned concrete is used in its production.

What are the benefits to the environment with Owacon ?

Because it is a pervious type of concrete, Owacon reduces the "heat island" effect. Also, if it is produced using returned concrete, it promotes the return and recycling of concrete, thereby reducing the amount of waste produced. Owacon is a very interesting application of RE-CON ZERO EVO which enables innovative pervious paving to be created in a very simple way using traditional concrete, or even returned concrete, with a view to promote and encourage environmental sustainability and a circular economy.

CEO of Nagaoka-Ready Mixed Co and inventor of Owacon

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Fibre-reinforced high performance concrete was lately used on three bridges along the A4 Küssnacht-Brunnen motorway.

HPFRC tested on site in Switzerland

LIGHTER, MORE DUCTILE, MORE SUSTAINABLE CONCRETE

HPFRC (High-Performance Fibre-Reinforced Concrete) is made from cement, silica fume, fine-grained sand, fibers, a plasticising admixture and water. Compared with standard concrete, it contains 3 to 4 times more cement. The silica fume improves its compactness and homogeneity during the mixing phase and the high amount of fibers makes this type of concrete more ductile and more resistant to wear compared with standard concrete. It is waterproof without applying an additional layer, does not need mechanical fasteners and, after just 24 hours, has the same mechanical characteristics as standard concrete after 28 days. As it can also be laid in a lower thickness, it is possible to limit its weight and impact on the environment. In addition, this type of concrete opens new horizons regarding the renovation of concrete structures, in that they may be more easily repaired rather than demolished, resulting in far less landfill waste and lower consumption of raw materials required for new constructions.

Recent renovation work carried out on a 20 km section of the A4 Küssnacht-Brunnen motorway in Switzerland demonstrated the enormous potential of HPFRC, which was used for the refurbishment of three bridges. Mapei, through its subsidiary Mapei Suisse SA, contributed to the mix-design of the concrete, which was produced by Kibag Management AG. Tests were carried out in the company's laboratories in Sorens to pinpoint the ideal formula to obtain a concrete mix with high compactness and workability. For the mix, Mapei supplied super-plasticisers, silica fume and admixtures to cure the concrete and to meet all the other requirements of the site. The concrete itself was mixed directly on site and, thanks to its particular characteristics, no waterproofing treatment was needed, and execution times were considerably reduced.

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San Giorgio Bridge in Genoa

THANKS TO MAPEFAST ULTRA THE PROJECT WAS COMPLETED IN RECORD TIMES

The Genoa-San Giorgio Bridge, inaugurated on 3rd August, has replaced the Morandi Bridge, which collapsed on 14th August, 2018. Reconstruction of the bridge, designed by Renzo Piano, was completed in just two years with sustainability as the guiding principle for the building works. The concrete used was a CEM III/A cement, a binder where 40 % of the clinker is replaced by blast-furnace slag. This type of cement is characterised by low CO_2 emissions and the recognized ability for producing strong and durable concrete, resistant to the aggressive atmospheric agents.

The new bridge had to be completed in as short a time as possible. This would never have been possible without the use of MAPEFAST ULTRA, an accelerating admixture developed in the Mapei Research & Development laboratories in collaboration with the University of Padua. Indeed, CEM III/A is a slow hardening binder and the concrete would have been unable to develop the required mechanical strength to proceed quickly with the erection of the piles. Thanks to MAPEFAST ULTRA, which makes use of Secondary Nucleation (SN) technology and gave a relevant contribution in developing early compressive strength, it was possible to remove the formwork, even in the middle of winter, just 16 hours after placing the concrete and to proceed with the construction of the piles at an extraordinary rate. To ensure the concrete retained the S5 consistency class while being transported from the mixing plant to the jobsite, a combination of DYNAMON XTEND W400N and DYNAMON EW superplasticizers was also used.

BELOW. MAPEFAST ULTRA was developed and tested in the Mapei Research & Development Laboratory in collaboration with the CIRCe Center of the Padua University.

Chemical admixtures: indispensable ingredients

THE INDUSTRY PROFESSIONALS GATHERED IN MILAN FOR TWO INTERNATIONAL CONFERENCES SPONSORED BY MAPEI

Two international conferences on concrete technology, organized by ACI – Italy Chapter, the Italian division of the American Concrete Institute ACI in partnership with the University of Bergamo's Department of Engineering and Applied Sciences, were held in Milan from 10th to 15th, July 2022.
SOCAC was the thirteenth edition of the International Conference on "Superplasticizers and Other Chemical Admixtures in Concrete". This is the most important event where the international scientific community, industrial scientists and professionals meet and debate the important and innovative aspects of chemical admixtures.
RACTSI was the fifteenth edition of the International Conference on "Recent Advances in Concrete Technology and Sustainability Issues" dedicated to the latest developments in concrete technology and focused on the subject of sustainability in the concrete industry.
Both the conferences were attended by numerous experts from various countries and continents and sponsored by such leading companies in the industry as Calcestruzzi - HeidelbergCement Group, Colabeton, Draco, Federbeton and Mapei, which was the Main Sponsor of the conferenceS.
Walter Nussbaumer, the Mapei Group's Corporate Liquid Admixtures Director, was also one of the members of the scientific committee that helped stage the events.

Across-the-board sustainability
The topics covered in both conferences by the speakers ranged from new superplasticizers and other admixtures and their mechanism of action, CO_2 reduction in the manufacture of Portland cement, the durability of concrete, corrosion and repairing concrete, life cycle analysis (LCA) of materials, polymer- and polymer-modified concretes, new analysis methods, aggregate alternatives to Portland cement, geopolymers, shrinkage-compensated concretes, high-density concretes and concretes used in marine settings.
Six experts from Mapei Research & Development laboratories took part in the proceedings by giving speeches on specific topics. Most notably:

- Giorgio Ferrari illustrated the vision of Mapei regarding the next generation Low Carbon Concrete Admixtures (LCCAs). LCCAs can be defined as admixtures capable of enhancing the performances of blended cements both in terms of early and final strength, without affecting the durability of concrete.
- Fabio Castiglioni highlighted how the dispersive strength of super-plasticising admixtures, particularly those based on PCE polycarboxylates, can be considerably affected by the presence of clay-containing aggregates in concretes.
- Francesco Surico spoke about durable concretes with low CO_2 emissions specially formulated using Mapei admixtures for San Giorgio Bridge in Genoa.
- Paolo Fornoni devoted his speech to the effects of different types of clays on the initial fluidity of mortars mixed with polycarboxylate-based superplasticising admixtures.
- Danilo Passalacqua outlined the results of a study into various means of creating concrete resistant to microbiologically induced corrosion.
- Fabio Curto showed how knowledge of the physical-chemical properties of admixtures can lead to a significant improvement in the workability of concrete.

Giorgio Ferrari (R&D Group Leader, HPSS, Mapei Group) presented a keynote titled "Where are admixtures going?", illustrating the next generation of Low Carbon Concrete Admixtures (LCCAs).

Sustainable mobility with charging on the move

TESTING UNDERWAY ON A WIRELESS VEHICLE CHARGING SYSTEM IN THE ARENA DEL FUTURO CIRCUIT ALONG THE BREBEMI MOTORWAY IN ITALY

The future of mobility is electric. And what is more, charging will be carried out while actually travelling. A futuristic scenario, but it's getting closer. In fact, projects have been launched in various countries to study and develop wireless charging for electric vehicles: in Tel Aviv, for example, on the city bus service and on the island of Gotland, in Sweden, on the airport shuttle-bus service. And in Italy, too, the Arena del Futuro project has been officially presented, a circuit one kilometre long in Chiari in the Province of Brescia where a DWPT (Dynamic Wireless Power Transfer) wireless charging system for electric cars is being tested and developed.

The technology, chosen by the company in charge of Brebemi (the A35 motorway running between Milan, Bergamo and Brescia) and the Spanish company Aleatica in collaboration with Milan Polytechnic, was supplied by the Israeli company Electreon and chosen because of its versatility and sustainability. With this system electric vehicles are charged while travelling along special cabled lanes, thanks to a system of coils positioned around 80 cm below the bituminous road surfaces. The vehicle's batteries are charged as they pass over the coils, thanks to a phenomenon known as electric induction.

Testing started at the end of 2021: an electric Fiat 500, an intercity bus by Iveco and a Jeep Renegade Full Electric have been testing the performance of the system in the circuit. The results are encouraging, and the next step should be the laying of cables along the offside lane of the A35.

The aim is to improve the autonomy of batter ies without over-burdening vehicles, reducing charging times and, therefore, the need for lengthy stops during a journey, but also to overcome infrastructure constraints regarding the number of charging points available for drivers on the road network..

Synergy in the name of sustainability

A mobility system with wireless charging would have "zero emissions" and would represent an important step towards a "carbon-neutral transport" network. The various elements that make up the system (asphalt, control units, cables, electric vehicles and 5G connectivity) have been developed by the various companies of excellence involved in the project. In fact, companies and organisations recognised as reference points in their particular area of expertise are all collaborating in this project. And among them there is also Mapei, supplier of products for this project in the name of sustainability.

A CUTTING-EDGE SOLUTION

by **Francesco Bettoni**

The experimental "Arena del Futuro" circuit is one of the most innovative at global level to encourage decarbonisation in the world of transport and, as a result, ecological transition. What is behind this idea?

It started a few years ago with Brebemi SpA setting an objective to find new solutions to reduce CO_2 pollution along the Padano Corridor, the main road network in Northern and Central Italy.

Decarbonising transport is the challenge of the future.
Do you think wireless charging technology paves the way for new opportunities towards a more widespread use of electric cars?

I can answer that question with a phrase the former Italian Prime Minister Mario Draghi used in the message he sent us on the eve of the presentation of the "Arena del Futuro" project, on the 10th of June this year in Chiari. He declared: "The creation of a circuit with the capacity to charge electric cars while they are in motion is an important step in the right direction, a cutting-edge solution that provides a concrete answer to one of the problems that could limit the diffusion of electric mobility".

The project has seen the collaboration of important companies and universities: synergy between centres of excellence is increasingly decisive when it comes to innovation. Is this type a type of collaboration that could be replicated for a more sustainable transport system?

We have built a valid model for all those who intend launching similar initiatives, so much so that some important networks have called it "a form of participative democracy fully convinced and aware that, together, a common important objective can be achieved".

How can wireless charging technology for electric cars help in the development of territories?

The future cannot be predicted but, rather, is created through work, passion, commitment, experience, professionalism, innovation and technology. The system we have developed and created accelerates ecological transition by decarbonising the transport of goods and people, thereby allowing territories that adopt it to offer "green" spaces with a strong and positive media impact in terms of manufacturing, clean surroundings, a better quality of life and more competitiveness.

What does the future hold for Arena del Futuro?

The future we envisage for Arena del Futuro is one with enormous possibilities and repercussions so exceptional that the DWPT (Dynamic Wireless Power Transfer) system can be defined as the world's fourth industrial revolution: roads, motorways, ports, interports, airports, large-scale carparks and modern logistics are the sectors that could benefit, with effects that would improve their image and make them CO_2 neutral.

Chairman of Brebemi SpA

by **Giuseppe Mastroviti**

How we experimented artificial intelligence

LOTS OF TECHNOLOGICAL CHALLENGES WITHIN THE PROJECT

Arena del Futuro is a pilot project in Italy: which international context were you inspired by?
Our interest in ERS (Electric Road Systems) dates back to 2018 when we saw several sites where very interesting projects were being developed: in Sweden, where they were using aerial cables, and in Israel. In Tel Aviv we were given the opportunity to see a project in which wireless charging technology was being used, and we were really impressed. The project was in its initial stage: along 40 m of asphalt charging coils had been embedded and, to show that electrical energy was really circulating, electric boilers had been placed on the road surfaces and the water was boiling. We saw that there was enormous potential with this technology so we started working on our project, along with other important companies to bring our different areas of expertise together and to have the contribution of different stakeholders interested in developing wireless charging.

What were the biggest challenges for the project?
The project had to overcome many challenges, the first one being to get the other stakeholders involved: the first thing we had to do was to convince the sceptics, then we had to coordinate a lot of technicians from different companies, including at international level. It was an enormous task, made even more difficult by the pandemic and the impossibility to have face-to-face meetings. We had to deal with some very large companies, and it wasn't always easy to pass information around because of the issue of trade secrets.
I am, however, particularly satisfied with the result, but all too aware that there is still a lot to be done.

What are the benefits of wireless charging for drivers?
With wireless charging, drivers of electric vehicles can carry out long journeys without having to stop to recharge a vehicle's batteries. This means that electric cars, often used for journeys within a certain range, will be used just like a compact car, and this will lead to electric cars becoming more widespread.

And what benefits would it bring to the logistics sector?
For heavy-goods vehicles this would lead to a reduction in the number of batteries being held, in terms of weight and volume. Having a constant charge would mean being less tied to the need for batteries and on their supply, which is particularly difficult now due to the instability of international markets and the scarcity of the raw materials required to manufacture them.

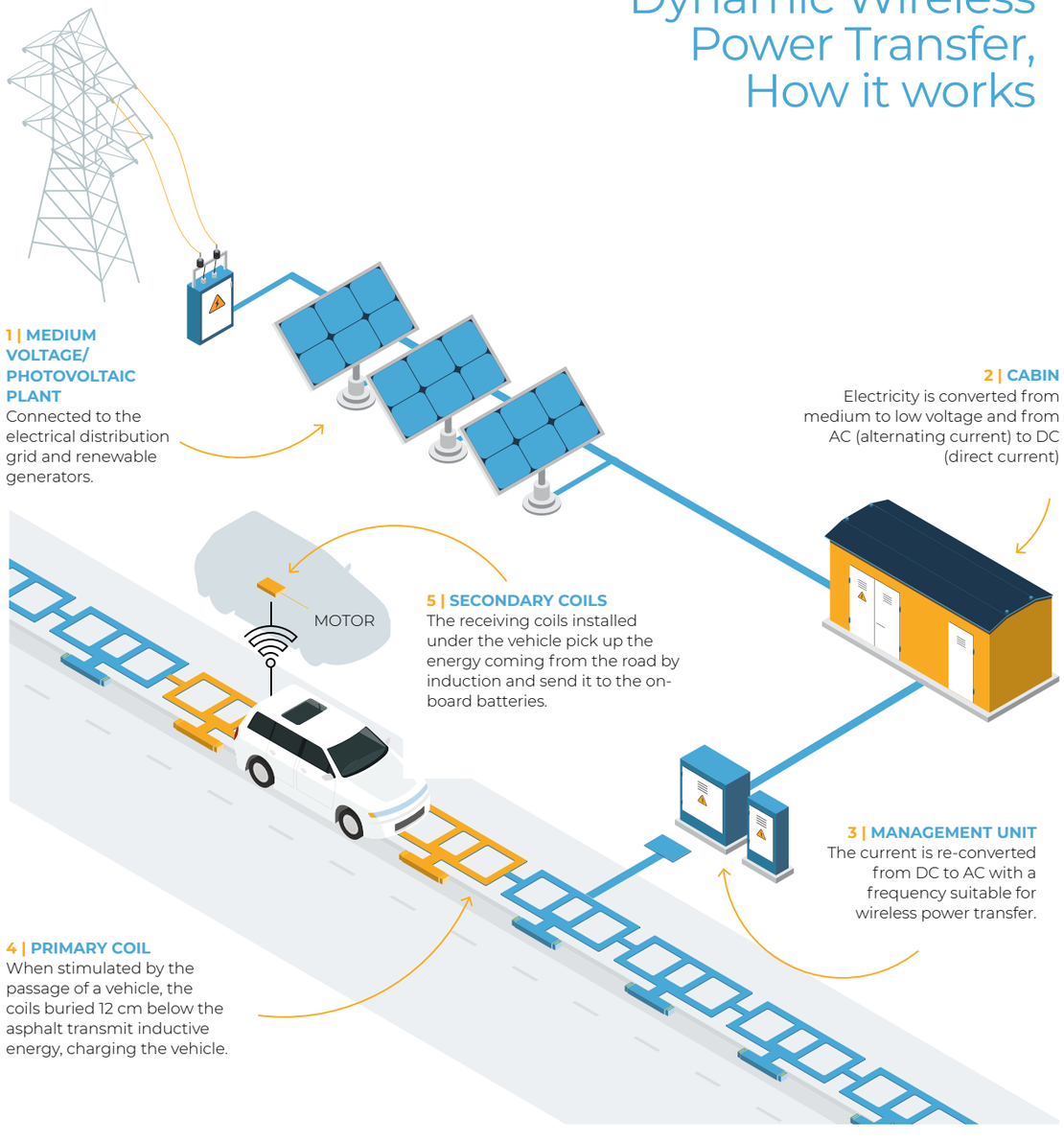
What role does Artificial Intelligence play in the project?
At the moment Artificial Intelligence is used to improve communication between a vehicle and infrastructures, to make the exchange of data more efficient (such as speed or energy absorbed) and to improve the safety of drivers and passengers. In the future we could use it for other scopes, such as helping a vehicle to remain "hooked up" to the energy source without distancing it from the coils.
.
So what are next steps?
We still have a lot of work to do to get a better understanding of the limits and areas where this technology can be applied. It will be important to understand how to make Electric Roads compatible in different countries so that drivers can travel from one country to another without any problems. I am part of a task force (2.2 Electric road systems) within the PIARC World Road Association involved precisely with this issue and the future path of transport systems at a global level.

Technical and Production Director, Brebemi SpA

Watch the video

"Considerable benefits for road transport: fewer batteries in a period when the raw materials required for their production are in short supply

Dynamic Wireless Power Transfer, How it works



Mapei for Arena del Futuro

FROM MORTARS TO WATERPROOFING MEMBRANES: THREE COMPANIES OF THE GROUP SUPPLIED SOLUTIONS FOR A HIGH PERFORMANCE CIRCUIT

Mapei joined the "Arena del Futuro" project from the outset with great enthusiasm, recognizing that it encompassed two fundamental values that are part of its company's DNA: sustainability and innovation.
The Group involved three of its companies for the "Arena del Futuro" project: Mapei SpA and Vaga to supply mortars and admixtures for the bituminous conglomerates, and Polyglass for supplying waterproofing bituminous membranes.
Mapei's objective was to use its Research & Development laboratories to develop cutting-edge technology that would make the road layers that house magnetic coils more durable and compatible with localised magnetic fields and make it possible to complete maintenance work more quickly compared with normal road surfaces.
The most important elements of the Mapei "Arena del Futuro" road system include a special induction mortar to protect the coils; a trench mortar for laying and embedding the cables and control units; a self-adhesive bituminous waterproofing membrane supplied by Polyglass (a subsidiary of the Mapei Group); admixtures to make it easier to lay the bituminous conglomerate, and extend its service life.
The day the project was presented to the public, Marco Squinzi, CEO of Mapei, claimed: "M*apei will continue to provide its research and innovation expertise for the "Arena del Futuro" project, the aim being to find new solutions that make installation even simpler and that enable this system to become accessible and more widely adopted, thereby contributing to achieve the objectives of the Fit for 55 package presented by the European Commission as part of the Green Deal initiative*".
Mapei had previously contributed to the completion of the A35 motorway in 2010-2014 when it supplied products such as MAPELASTIC to waterproof abutments, strips and beams and ELASTOCOLOR RASANTE SF and ELASTOCOLOR RASANTE for coating and protecting their surfaces (see *Realtà Mapei International* no. 51).

Mapei products were used to make the road layers housing the magnetic coils that allow wireless charging.

BESPOKE PRODUCTS FOR LONG-LASTING ROAD SURFACES

by **Gilberto Del Zoppo**

THE ROAD ENGINEERING LABORATORIES HAVE DEVELOPED MATERIALS COMPATIBLE WITH MAGNETIC FIELDS THAT PROTECT THE COILS

For the Arena del Futuro project Mapei has supplied products compatible with the presence of localised magnetic fields. Did you modify products that were already available? And if so, in which way?
The products supplied for Arena del Futuro were developed specifically for the project using Mapei's experience: mortars, bituminous membranes and admixtures. Going into detail, not only was the trench mortar developed so that it had the capacity to flow around the cables in the trench and had good mechanical and dimensional properties, it was also modified with elastomeric polymers to make it more elastic and more compatible with the bituminous conglomerate substrate in terms of both chemistry and stiffness modulus.
The rapid-setting induction mortar, on the other hand, apart from containing non-ferromagnetic materials to prevent interference with the magnetic field generated by the coils, also had the capacity to be free of surface dust, strengthened with synthetic fibres, and able to bond to the different substrates (cementitious and bituminous) and feature good dimensional stability.

How do the solutions supplied by Mapei help extend the durability of the paving? And how do they make maintenance work easier?
The POLYSTRADA SA-V self-adhesive bituminous waterproofing membrane, the only pre-existing product proposed in the system, had been developed to be positioned under the binder layer or wearing course layer to extend its service life, enabling excellent adhesion between the layers, including those of a different nature, and preventing cracks propagation from below levels.
MAPEI PROTECTION MF, which was added to all the bitumen in the bituminous conglomerate, was developed by Mapei in collaboration with Parma Polytechnic and Turin Polytechnic.
This is a synthetic polymer with anti-oxidant properties and has the ability to extend the service life of the bituminous conglomerate it is used in, contrasting oxidation and ageing of the binder and making it more persistent around the aggregates.
These Mapei systems were also designed to simplify future maintenance work on the upper layers of bituminous conglomerate (binder and wearing layers), protecting the coils below during milling, resurfacing and compacting operations. In fact, the coils should last at least thirty years before being changed.

Some of the products supplied are from Mapei's dedicated Bituminous Road Engineering Line and were developed in the Road Engineering laboratory in Milan. Could you give us a brief presentation of the line and the main activities carried out in the laboratory?
Mapei Road Engineering laboratory (see the photo on the left), a satellite lab of the main Mapei Research & Development Centre in Milan, is a complete laboratory where we synthesize and develop products for bitumen, bituminous emulsions and bituminous conglomerates and check their chemical, physical and mechanical performance properties. New technologies for roads are developed here, sourcing from the collaboration and synergy with all the other Mapei R&D teams and using their specific areas of expertise to adapt them to the various road application. The laboratory also carries out a lot of studies, checks and consultancy work on large-scale motorway and airport projects, both in Italy and abroad (see *Realtà Mapei International* no. 85).
Our product portfolio includes adhesion promoters and antioxidants that create a stronger bond and reduce the tendency of bitumen to leach from the aggregates; regenerators for oxidised bitumen derived from recycled asphalt paving (RAP); emulsifiers for acid and basic bituminous emulsions for different applications; polymers to modify bitumen and bituminous conglomerate; fibers for pervious asphalt; fibre-reinforced bituminous membranes for long-lasting roads with more resistance to degradation; cold-applied bituminous and resin-based sealants for cracks and joints; epoxy resins to consolidate old paving and to create anti-kerosene barriers; self-levelling filling mortars for hybrid systems, ideal for ports, interports and logistics hubs, as well as many other admixtures and products to complete and meet the requirements of the road construction market, all in the name of sustainability and innovation.

Road Engineering Line, R&D Laboratories, Mapei SpA (Italy)

20 years of Mapei Hellas

A hub for Mediterranean countries

INTERVIEW WITH DR. SPYROS PAPAGIANNAKIS, THE SUBSIDIARY'S GENERAL MANAGER

The serious financial crisis just over 10 years ago that consumed Greece, the recent situation connected with Covid-19 and now the effects of the war in Ukraine: what are the prospects for the building industry in Greece at the moment? How does Mapei fit into this state of affairs?
I would rather not focus on the negative side of the situation in which we operate. We all face challenges in the course of our lives, and that also applies to nations and companies. I believe we should always try and be optimistic: a strong and well-organised company can withstand and even grow in any challenging situation. And that is exactly what Mapei Hellas has been doing in recent years, when it has even managed to triple its sales. Paraphrasing Giorgio Squinzi's famous motto, we have 'never stopped pedalling'.

Tourism is the most important resource for relaunching the Greek economy. Is this a key industry for Mapei too?
Mapei Hellas products are used to build and renovate the most prestigious hotels throughout Greece, as well as in Cyprus,

Lebanon and Israel. Take, for instance, the numerous hotels of famous chains in Crete, Rhodes, Kos, Athens and Thessaloniki. Our experts in the Technical Department help architectural designers and businesses involved in their construction or redevelopment projects by finding out and suggesting just the right products and systems. Our clients receive across-the-board assistance not only from the Mapei Hellas team but also, if necessary, from the specialists of the parent company Mapei SpA. This synergy and constant exchange of know-how between Mapei SpA and Mapei Hellas, especially when it comes to major and demanding projects, gives us a significant edge and has helped us build loyal partnerships with even the most demanding clients.

Greece is gambling on the new Hellenikon real-estate project where the capital's old airport used to be located. A major investment plan to relaunch the economy: what opportunities are opening up for Mapei in relation to this project or other major infrastructure projects?
After a long series of delays, the Hellenikon project is finally getting underway. It is an € 8 billion prestigious investment project with numerous tricky technical challenges to be dealt with. Mapei's know-how and products will be used to meet all the technical demands involved in the project.

Mapei Hellas' strong point is its products for installing ceramic: what other sectors and product lines do you intend to focus on?
We are preparing for the launch of the INTOMAP range of lime-based renders. We will start by introducing six products, which meet all the

Revenue tripled in the last 6 years

Mapei Hellas was founded in Athens in 2001 to distribute products for building in the Greek and Cypriot market. In 2011 the company opened a plant in Ritsona, not far from Athens, to manufacture products to install ceramic tiles and stone. Manufacturing was then expanded in 2015 with the start-up of a plant for liquid concrete admixtures. The new plant for crushing calcium carbonate also started up at the beginning of 2020 and is now operating at full capacity. Recently, the INTOMAP range of plasters, has been added to the various lines of products manufactured in Greece which include products for installing ceramic and stone materials, laying cementitious and resin floors, waterproofing, coating walls, strengthening, repairing concrete and systems for thermal insulation. In addition, a new range of grouts is also being introduced in 2022.
By constantly expanding its manufacturing output, Mapei Hellas has managed to increase its turnover from 10 million Euros in 2016 to 30 millions expected turnover by the end of 2022. These achievements were also confirmed by the double award that Mapei Hellas obtained during the Sales Excellence Awards event organized last June by the Hellenic Sales Institute, namely: Gold Award in the category "Distinction in the Sales Sector - Industry - Trade of durable products" for the sales growth achieved in recent years (63% 2017 vs 2021) and Silver Award in the category "Excellent Performance in the Sales Sector - Export Growth - Growth in International Markets" for increasing export activity in 2021 by 55%. In the photo: the award-giving ceremony.

Mapei Hellas' plant is located in Ritsona, not far from Athens.

"Not just ceramic products. We are preparing to launch a range of lime-based renders

MAPEI HELLAS

2001
YEAR IT WAS FOUNDED

80
STAFF

1
MANUFACTURING PLANT

30
MILLION EUROS
EXPECTED TURNOVER IN 2022

“ Mapei know-how and materials for building works on a new real-estate project on the site of Athens’s old airport

basic needs of the Greek market. Later we will complete the range with a more 'sophisticated' product. We devised this strategy with the real and regular needs of the market in mind. This launch will allow us to complete Mapei Hellas' product portfolio so that it can meet the priorities of clients in Greece and neighbouring countries.

How are Mapei's sales networks currently organised in such a complex country from a geographical/ territorial viewpoint? And how are sales channels changing in Greece?
We market our products through the B2B network. This is a rule with few exceptions: we rarely sell directly to construction companies. This strategy helps us establish good working relations with our distributors. Most of our clients are ceramic tiles retailers. For the time being, the DIY (Do-It-Yourself) industry is not of crucial importance to us, even though we do work with the large retail chain Praktiker. Our goal for the coming years is to break into the market for renovating historical buildings with the help of the INTOMAP range serving the retail industry.

Is the Ritsona plant a manufacturing hub for supplying Mapei products to neighbouring countries, starting with Cyprus?
Yes, we can easily supply our products and systems to countries such as Cyprus, Lebanon, Israel, Malta and Albania. We have also recently started to distribute in Libya. Mapei Hellas has a strategic location that allows us to supply, with very low costs, all the Mediterranean countries and southern Balkans.

Quality is a key principle of the Mapei Group. Have you received significant recognition and commendations in Greece, too?
The quality of Mapei Hellas is acknowledged by all our clients and end users. Recently, in order to optimise the speed of our services and to work even more closely with our customers to meet their specific needs, we are setting up a new Research & Development Laboratory that will allow us to focus on developing new products like those belonging to the INTOMAP, PLANITOP and other ranges. Furthermore, the Laboratory will allow us to raise the standards of our products at lower costs. The Mapei Hellas R&D Laboratory works closely with and under the supervision of the Mapei Group's Central R&D Laboratory located in Milan. In short, our unwavering commitment to quality is one of our hallmarks and gives us a significant edge in getting clients to choose our products.

Commitment to quality and human resources

Mapei Hellas has always been attentive to the certified quality of its products, structures, and processes. Since 2010 it has adopted a quality management system certified by TÜV AUSTRIA in compliance with the ISO 9001 standard. In recent years, the company has joined various projects aimed at promoting the compliance of all stakeholders to the highest quality standards.
In 2019 Spyros Papagiannakis, General Manager of Mapei Hellas, was recognized as Quality Leader of the Year by the Hellenic Management Association (EEDE) with the support of SEV, the leading national association of Greek manufacturing and service companies.
Moreover, Papagiannakis was awarded third prize in the 2019 European Quality Leader Award Contest, an honour that the European Organisation for Quality (EOQ) awards to people who have enabled their companies to achieve positive results by optimizing quality control procedures.
Mapei Hellas's General Manager emphasizes that the company's success is partly due to a continual focus on human resources: "Mapei Hellas is a big family that includes everyone: staff, clients, and suppliers. People are our greatest asset. This approach has guaranteed us a prominent position on the domestic market: the popularity of Mapei Hellas is growing, and we are constantly increasing our market share compared to our competitors."

Mapei Hellas celebrates 20 years in business

In the splendid setting of the Four Seasons Astir Palace hotel in Vouliagmeni, on June 20th Mapei Hellas celebrated twenty years doing business and operating in the Greek building industry. The event was also attended by Patrizia Falcinelli, Italian Ambassador to Greece, and Orestis Kavalakis, General Secretary for Private Investments and Public-Private Partnerships in the Greek Ministry of Development and Investments. On this occasion, as well as retracing the path that led Mapei Hellas to become one of the three most influential companies in the industry, the General Manager, Spyros Papagiannakis, pointed out that "In Mapei Hellas we all feel united as a family sharing the same principles and values and also part of a multinational group headed by our CEOs, Veronica and Marco Squinzi, who are the third generation of an important family business tradition". In remembrance of Mapei's special relationship with music, the event also featured a 'journey' into the world of opera thanks to the performance by the mezzo-soprano Rosa Cappon Poulimenou and the tenor Yiannis Christopoulos accompanied by L'anima string quartet, who performed pieces once performed by Maria Callas.

From left: Orestis Kavalakis, Spyros Papagiannakis, Laura Bosser, Fabio Fenech, and Patrizia Falcinelli.

Snapshots from the event held on 20th June when Mapei Hellas celebrated its 20th anniversary.

Tinos, Cyclades Islands

Lap pool house

DESIGNED ACCORDING TO MODERNIST IDEALS, THIS RESIDENCE INTEGRATES PERFECTLY WITH THE ROCKY LANDSCAPE OF THE CYCLADES ARCHIPELAGO

The island of Tinos, in the Cyclades archipelago, is renowned for its rocky landscape with beaches hidden in coves scattered amongst the cliffs. And it is here that the architect, Aristides Dallas, has created a country residence that blends in perfectly with the surrounding territory and the untouched nature typical of this island. Its architectural lines are a reminder of modernism and the Bauhaus style: essential forms, intersecting parallelepipeds and surfaces in exposed concrete. The grey of the villa draws on the colour of the surrounding rocky landscape, thereby creating a sense of continuity between the work of man and that of Mother Nature.
The building is characterised by a large slab of concrete acting as the roof, with two volumes in the form of a parallelepiped, perpendicular to each other, reaching outside and containing the more "intimate" areas of the villa: the master bedroom and the guest room. The central space below the concrete roof houses the lounge and kitchen, with access through sliding doors directly onto the swimming pool.
The pool, particularly long and in the form of a rectangle, is the focal point of the entire construction: from the centre of the villa, it extends right up to the edge of the hill on which it sits, providing the owners of the villa and their guests with enchanting views of the sea and the whole horizon.

IN THE FACING PAGE. The villa designed by Aristides Dallas is particularly striking for its essential lines, intersecting volumes and concrete surfaces that were waterproofed with PLANISEAL 88.
RIGHT. The substrates in the swimming pool were waterproofed with MAPELASTIC SMART before bonding glass mosaic with KERAFLEX MAXI S1 and grouting joints with KERAPOXY CQ..

In so doing the architect has managed to create a dynamic complex, characterised by just a few "powerful" design elements expertly inserted into the surrounding landscape.
Which is why, along with the originality of its design, the villa has attracted a lot of attention from the media dedicated to architecture and has been nominated for the 2022 edition of the Mies van der Rohe Award for contemporary European architecture.

Protection for the concrete

Mapei solutions were employed to build various areas of the villa. After removing the formwork from the various concrete elements that make up the structure, uneven areas in the concrete surfaces were levelled off with MAPEGROUT THIXOTROPIC fibre-reinforced, compensated-shrinkage mortar, classified R4 according to EN 1504-3.
The external concrete surfaces were then waterproofed with PLANISEAL 88 osmotic cementitious mortar, which complies with the requirements of EN 1504-2.

Waterproofing the pool and installing mosaic

The internal surfaces of the swimming pool were also waterproofed with a solution proposed by Mapei. In this case the product chosen was MAPELASTIC SMART two-component cementitious mortar with high flexibility. Applied with a trowel or roller, it is ideal for applications such as swimming pools, as well as for balconies, terraces and bathrooms. In fact, MAPELASTIC SMART is particularly suitable for waterproofing surfaces with an irregular shape and, thanks to its high rate of elongation at failure (120%), it is often used for protecting concrete structures, render with micro-cracks and cementitious surfaces in general exposed to vibrations that could result in the formation of cracks. Resistant to UV rays, MAPELASTIC SMART complies with the requirements of EN 1504-2 and EN 14891.
Mosaic tiles were bonded in the swimming pool using KERAFLEX MAXI S1, a white, deformable adhesive with extended open time, Low Dust technology and no vertical slip. The tile joints were then grouted with KERAPOXY CQ two-component, anti-acid, epoxy mortar with a bacteriostatic agent and BioBlock® technology, a grouting product which is easy to apply and has excellent cleanability.
Using a complete Mapei system has enabled the durability of the surfaces of the pool to be guaranteed while, at the same time, played an important part in creating such a high aesthetic impact.

Find out more
MAPELASTIC SMART

TECHNICAL DATA
Lap Pool House, Tinos (Cyclades, Greece)
Period of construction: 2017
Architectural design: Aristides Dallas Architects (Aristides Dallas, Konstantinos Stathopoulos)
Structural design: Theodoros Chrysovergis, Emmanouil Roditis
Interior design: Evangelos Tentis
Period of the Mapei intervention: 2017
Intervention by Mapei: supplying products for concrete repair, waterproofing and installing glass mosaics
Contractor: Aegean Construction & Development by Louvaris
Mapei distributor: Stergioti Bros
Mapei coordinator: Sakkas Charalampos, Mapei Hellas
Photos: Panagiotis Voumvakis, Mariana Bisti

MAPEI PRODUCTS
Smoothing and protecting concrete surfaces:
Mapegrout Thixotropic, Planiseal 88
Waterproofing substrates:
Mapelastic Smart
Bonding and grouting glass mosaics in the pool:
Keraflex Maxi S1, Kerapoxy CQ

For further info on products: mapei.com and mapei.gr

Athens

The Orbit

FROM UNFINISHED BUILDING TO ONE OF THE MOST INNOVATIVE HUBS IN GREECE: ULTRAMODERN OFFICES WITH RESISTANT FLOORS AND HIGH AESTHETIC IMPACT

Until a short while ago, at 115 Via Kisias in Athens, there was an 8-storey building with a further 7 floors below ground level covering a total surface area of more than 36,000 m^2. Construction of the building had never been completed and, for ten years, it remained unfinished: a "ghostly" monument in steel and glass, a symbol of the economic crisis that has hit Greece for the last ten years. Recently Nikos Drandakis, founder of the start-up company BEAT, wanted to create ultramodern offices on this site for the headquarters of his company, which is in constant growth and is dedicated, first and foremost, to the development of the company's taxi app. The international architecture studio LC (Lianou-Chalvatzis) was commissioned to design the new complex and came up with a complete redevelopment plan and a new look for the building. The aim of the architects was to create a cutting-edge structure in terms of innovation, modernity, technology and sustainability. And today "The Orbit", which houses on the fourth floor the offices for the 380 employees of BEAT, has completely changed the look of the neighbourhood, becoming an "icon" of modern Athens and creating a hub of innovation to attract talented people, including those who have left Greece in recent years.

Project overview

Work lasted three years and resulted in the creation of a building characterised by a constant dialogue between the curved, horizontal lines around the building and the vertical lines of its glass surfaces.
The office spaces are divided into shared and private areas, conference rooms and versatile spaces dedicated to relaxation, meditation and brainstorming, creating a complex that is both innovative and creative.

The Orbit is a new complex with office space for innovative companies in a building recently renovated with Mapei solutions.

The internal courtyard features bridges and hanging gardens while, in the entrance, there is an enormous column covered with plants resembling a waterfall. The terraces, roof and the sides of the building have various green areas, further confirmation of how eco-sustainability was a guiding principle behind the design. So, it comes as no surprise that "The Orbit" has been awarded LEED Platinum certification, the highest recognition in terms of eco-sustainability of the Green Building Council.

Waterproofing below ground level

The seven floors below ground level had a problem with damp so the concrete needed to be repaired and waterproofed. The first step was to thoroughly clean the deteriorated areas. The reinforcement rods were protected with MAPEFER 1K anti-corrosion mortar. The areas of damaged concrete were reintegrated with MAPEGROUT THIXOTROPIC shrinkage-compensated fibre-reinforced mortar. Floors -1, -2, and -3 were waterproofed with two layers of MAPELASTIC flexible cementitious mortar, reinforced with MAPENET 150 glass fibre mesh embedded between the two layers, creating a seamless waterproofing layer to contrast the ingress of moisture into the internal spaces used as a carpark.

Resilient floors for the offices

A Mapei system was chosen to install resilient (LVT and loose-lay PVC) floors in the offices to guarantee not only strong, durable surfaces, but also compliancy with the high eco-sustainability standards specified for the project.
The substrates were treated with synthetic resin-based PRIMER G in water dispersion with very low emission of volatile organic compounds (VOC) to improve adhesion of ULTRAPLAN ECO 20, a self-levelling mortar produced and distributed in Greece by Mapei Hellas, which was applied on the primed substrates.
The resilient flooring was bonded with ULTRABOND ECO FIX adhesive and fixative with high residual tack, which is particularly suitable, as in this case, for installing loose-lay floorings. This product is an acrylic resin-based

The resilient flooring in the offices was bonded with ULTRABOND ECO FIX after preparing the substrates with PRIMER G and ULTRAPLAN ECO 20.

adhesive in water dispersion with very low emission level of volatile organic compounds (EMICODE EC1[Plus]-certified) which is easy to apply by trowel or with a roller. Once dry it remains tacky, which means flooring tiles can be easily removed and replaced at a later date. Furthermore, it may be used for floors exposed to heavy foot traffic and the passage of castor wheels, as specified in European standard EN 12529.

Find out more
ULTRABOND ECO FIX

TECHNICAL DATA
The Orbit, Athens (Greece)
Period of construction: 2018-2021
Period of the Mapei intervention: 2021
Design: LC Architects, Natassa Lianoy-Ermis Chalvatzis
Client: Noval Property
Project manager: Maria Korda
Main contractor: Terna SA
Installation company: Terna SA
Mapei coordinator: Maria Vardava, Mapei Hellas
Mapei distributor: Lianos
Photos: George Fakaros

MAPEI PRODUCTS
Concrete repair: Mapefer 1K, Mapegrout Thixotropic
Waterproofing foundations: Mapelastic, Mapenet 150
Preparing substrates: Primer G, Ultraplan Eco 20*
Installing resilient floors: Ultrabond Eco Fix

*This product is distributed on the Greek market by Mapei Hellas

For further info on products: mapei.com and mapei.gr

An overview of Greek projects

MAPEI SOLUTIONS CHOSEN TO BUILD AND RENOVATE STRUCTURES WITH VARIOUS AREAS OF USE ON MAINLAND GREECE AND THE GREEK ISLANDS

Euphoria Retreat & Spa
Mystras

Well integrated into the surrounding hilly landscape, the hotel also offers luxurious spa facilities. The foundations of the building were waterproofed with MAPEPLAN UG synthetic membrane in PVC-P produced by Polyglass (Mapei Group). To waterproof the green roofs, after creating an isolating screed, ANTIRADICE PE membrane was applied to prevent root penetration. The surfaces in various areas of the spa, such as those in the sauna and swimming pools, were waterproofed with MAPELASTIC SMART two-component, high-flexibility cementitious mortar reinforced with MAPENET 150 alkali-resistant fibre glass mesh.

Robinson club Ierapetra, Ierapetra, Crete

The concrete used to construct several of the resort's structures was formulated with the super-plasticiser DYNAMON EASY 11. After removing the formwork from the concrete elements, the reinforcement rods were protected with MAPEFER 1K and the surfaces were levelled off with MAPEGROUT THIXOTROPIC and waterproofed with PLANISEAL 88. The MAPETHERM thermal insulation system was installed on the façades and then finished off with QUARZOLITE BASE COAT and QUARZOLITE TONACHINO. MAPELASTIC and MAPELASTIC SMART were used to waterproof the surfaces in the swimming pool and bathrooms. And lastly, the joints in the ceramic and stone floor and wall coverings were grouted with KERACOLOR FF.

Leroy Merlin store
Athens

The fifth store in Greece of this famous DIY brand, the Athens branch opened in 2020 and occupies an area of 10,000 m². Waterproofing for 7,000 m² of the complex's roof called for reliable, long-lasting and high-performance solutions. Which is why MAPEPLAN B was chosen, a synthetic, waterproofing membrane in PVC-P compliant with EN 13956 standards, produced by means of a multi-extrusion coating process using raw materials of the highest quality and reinforced with a glass mat. Made by Polyglass, a subsidiary of Mapei Group, MAPEPLAN B ensured the system could be applied quickly thanks to its excellent mechanical properties, workability and weldability.

Athens tennis club
Athens

Founded in 1895, this is one of Greece's "historic" tennis clubs and has played an important role in spreading the popularity of this sport throughout the country. Members of the club have tennis and squash courts at their disposal, as well as a gymnasium, changing rooms with a sauna, a tennis museum and a restaurant. During the summer of 2020 the tennis courts were renovated with MAPECOAT TNS CUSHION, a multi-layered, acrylic resin-based system which consists of the application of three layers of MAPECOAT TNS GREY BASE COAT followed by three finishing coats of MAPECOAT TNS FINISH 1 in dark green and Sydney Blue colour shades. Work was completed by marking out the lines for the courts with white MAPECOAT TNS LINE paint.

Decathlon store
Athens

The second store opened by Decathlon in Greece was built in a former industrial complex. The new floors for the store had to be resin based, durable and resistant, as specified by the client. An epoxy resin system was applied over 3,000 m² of old industrial flooring. The substrates were mechanically prepared by grinding with diamond discs. Because the substrate was very porous, a double layer of PRIMER SN pigmented with MAPECOLOR PASTE, was applied, then blinded with QUARTZ 0.5. Two coats of MAPEFLOOR I 300 SL fillerized with QUARTZ 0.5 were then applied on the surfaces, again pigmented with MAPECOLOR PASTE (RAL 7047), before finishing off the floor with a final coat of MAPEFLOOR FINISH 58 W.

Resilient floorings: revival in the global market

THE MARKET IS FORECAST TO GROW AT AN AVERAGE YEARLY RATE OF 7.2% UNTIL 2028. THE INDUSTRY'S GLOBAL BUSINESS IS WORTH 38.7 BILLION US DOLLARS

Joan Kirner Women's and Children's Hospital, Melbourne (Australia).

The Orbit, Athens (Greece).

International School of Debrecen, Debrecen (Hungary).

According to Grand View Research, the global resilient flooring market size was estimated at 38.7 billion US dollars in 2020 and is expected to expand at a compounded annual growth rate (CAGR) of 7.2% from 2021 to 2028. Increasing investments in the construction sector coupled with rising demand for improvements in aesthetics of the building is anticipated to drive the demand for resilient floorings over the next few years.

The impact of Covid-19

The COVID-19 outburst across the globe has significantly impacted the supply chains as major economies across the globe suspended and delayed the construction projects. Due to this, demand for resilient flooring products has been reduced in residential and non-residential sectors. However, the situation is expected to recover in 2022.

The market is expected to exhibit growth owing to the commercial availability of resilient products, the development of hassle-free installation techniques, and the rising demand for environmentally sustainable materials. Innovations in construction solutions with attributes, such as high durability and low maintenance, are also anticipated to impact the market favorably. Besides, the development of eco-friendly flooring solutions like linoleum, hardwood, and bamboo for the betterment of the environment is expected to fuel industry growth. Also, technological trend such as the production of waterproof floorings like wood plastic composite (WPC) with high aesthetic value is expected to witness high growth over the projected period.

The residential segment is driving the demand

Resilient flooring is majorly used in non-residential sectors on account of numerous benefits associated with this engineered product along with its ability to create unlimited possibilities of designs and styles. Ease of maintenance, sterilization, slip and water resistance associated with resilient flooring are factors expected to promote the applications in hospital wardrooms and clinics for maintaining maximum hygiene levels. Moreover, customized solutions in the design and dimension of the products are expected to increase the penetration of resilient flooring products

Resilient floorings are majorly used in residential buildings, apartments, complexes, and small and single-family houses on account of resistance to slip, shock, stain, and dirt. Moreover, the cushion effect in resilient materials is also contributing to the growing demand.

Growing population coupled with a rise in demand for single-family and multi-family residential spaces in major economies such as India, China, South Africa, Turkey and Middle Eastern economies are projected to ascend the demand for flooring products, including resilient floorings, in the next few years.

The growing popularity of LVT

According to Markets&Markets, the luxury vinyl tiles (LVT) flooring market is projected to grow from 18.0 billion US dollars in 2019 to 31.4 billion US dollars by 2024, recording a CAGR of 11.7% from 2019 to 2024. Its commercial availability coupled with benefits like improved aesthetics, less maintenance, and easy installation are the factors for its growing popularity in residential and commercial flooring applications.

According to Grand View Research, the vinyl sheet and floor tile segment is expected to witness significant growth over the next few years on account of their water-resistant property. Moreover, low maintenance costs and the long lifespan of the products are likely to increase the popularity of the products in residential end-use like laundry rooms, bathrooms, kitchens, and moisture-prone areas.

In comparison to vinyl solutions, linoleum products have better longevity and durability. The increasing importance of waste management and recycling in developed economies including the U.S., U.K., and Germany, is anticipated to increase demand for biodegradable materials for floorings.

The Asia Pacific area is predicted to have the largest share in the resilient flooring market in the coming years

According to Fortune Business Insight, the global vinyl flooring market is projected to grow from 32.37 billion US dollars in 2021 to 51.45 billion US dollars in 2028 at a CAGR of 6.8% in forecast period, 2021-2028.

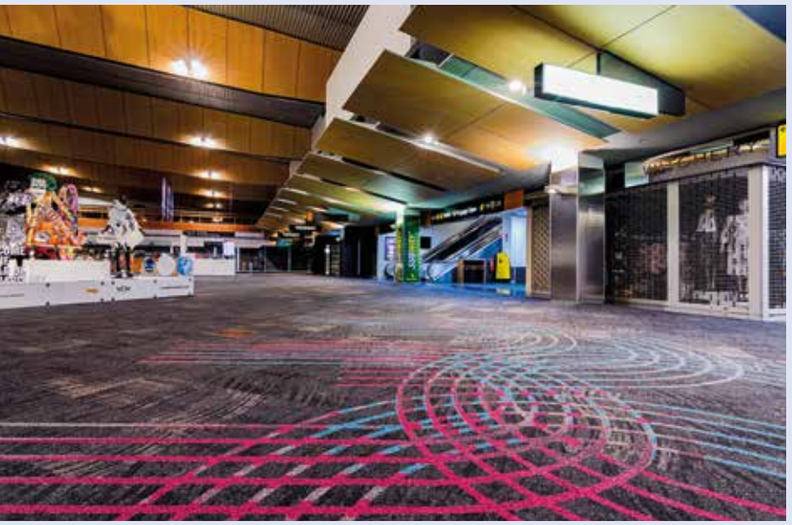
According to Credence Research, rubber floors are one of the most widely used floor coverings in the world, and they can be found in a variety of settings. They are environmentally friendly, perform well in terms of traction, slip resistance, and fire resistance, and are very simple to install and maintain.

The rubber floor tiles had a market value of 2,077.1 million US dollars in 2020, and it is expected to reach 2,851.2 million US dollars by 2027. The market is expected to grow at a CAGR of 4.0% over the forecast period.

Asia Pacific dominates the market

According to Market Research Future, the Asia Pacific area is predicted to have the largest share in the resilient flooring market in the coming years.

Growing population and a rise in demand for residential spaces in major economies are projected to ascend the demand for flooring products in the next few years



The Wellington International Airport, Wellington (New Zealand).

11.7%
CAGR (COMPOUNDED ANNUAL GROWTH RATE) OF **LVT FLOORS** FROM 2019 TO 2024

2,851.2
million US dollars
FORECAST MARKET VALUE OF **RUBBER FLOORS** IN 2027

51.45
billion US dollars
FORECAST MARKET VALUE OF **VINYL FLOORS** IN 2028

In 2019, the Asia Pacific region covered a large market share of about 34% which was followed by both Europe and North American regions.
This position is forecast to be maintained till 2026. The growth rate in the Asia-Pacific market owes to the steady rise in growth of the construction industry in some of the developing countries of China, India, and some of the South Korean areas.
In this region demand for resilient flooring is increasing and will occupy a high rate in the upcoming years.
The U.S. resilient flooring market size was valued at 21.04 billion US dollars in 2019 and is expected to grow at a compounded annual growth rate of 6.4% from 2020 to 2027.
According to Grand View Research, the U.K. accounted for a major share in the resilient flooring market in Europe in the last few years, in terms of consumption, owing to the steady growth of its residential and commercial construction sectors.
Increasing construction activities in London coupled with consumer spending on commercial spaces is expected to boost the product demand from the commercial construction industry in the U.K.
Rising consumer awareness regarding the benefits of appropriate flooring and the presence of key manufacturers is projected to have a major impact on the rising penetration of resilient flooring products in South American countries, as well.

Key companies and key technologies
Key industry players are focusing on the development of new flooring products having high aesthetic properties and additional characteristics such as waterproof, indentation resistance, and other improved performance values.
Mapei is able to offer a broad range of products and systems to install any type of resilient floorings ensuring high performances and safety to the installed surfaces as well as a proper preparation of substrates before installation work.

Functionality and versatility

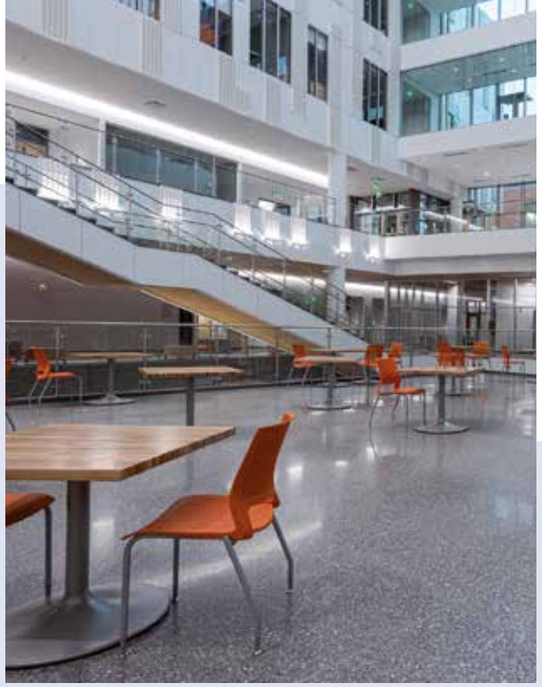
A SELECTION OF PROJECTS COMPLETED AROUND THE WORLD WITH PRODUCTS FOR INSTALLING RESILIENT FLOOR AND WALL COVERINGS

Swiss Paraplegic Centre
Nottwil, Canton of Lucerne, Switzerland

Renowned at international level, the Swiss Paraplegic Centre needed to be redeveloped and extended. Mapei contributed to the work supplying low emission products for the preparation of substrates and the installation of resilient floorings over a total surface area of 33,000 m². The substrates were treated with ECO PRIM T acrylic primer and then levelled off with ULTRAPLAN ECO XTRA ultra-rapid-drying, self-levelling compound, distributed by Mapei Suisse on the Swiss market. The conductive resilient flooring in the operating theatres and server room was bonded with ULTRABOND ECO V4SP CONDUCTIVE adhesive in water dispersion, while for the linoleum floors in other areas of the Centre, it was recommended to use ULTRABOND ECO 530, a fast and strong initial bond adhesive.

Wilbur O. and Ann Powers College
Clemson, South Carolina (USA)

Clemson University is well known for its top-ranked football team, the Tigers, and, academically, ranks among the top 20 universities in the USA. In October 2020, the Clemson University College of Business was renamed as the Wilbur O. and Ann Powers College of Business at Clemson University after two alumni made a 60 million US dollar grant to the school. The department was renovated and made use of Mapei products, distributed in the US by Mapei Corp., to install textile, rubber and LVT floors in hallways, offices and other areas of the building. The crews used ULTRABOND ECO 811 to bond the carpet tiles to the concrete floors and ULTRABOND ECO 575 adhesive to bond the rubber bases to the drywall on the walls. The concrete substrate was skimcoated with PLANIPREP SC before bonding LVT floors with ULTRABOND ECO 373.



Gosford Hospital
New South Wales, Australia

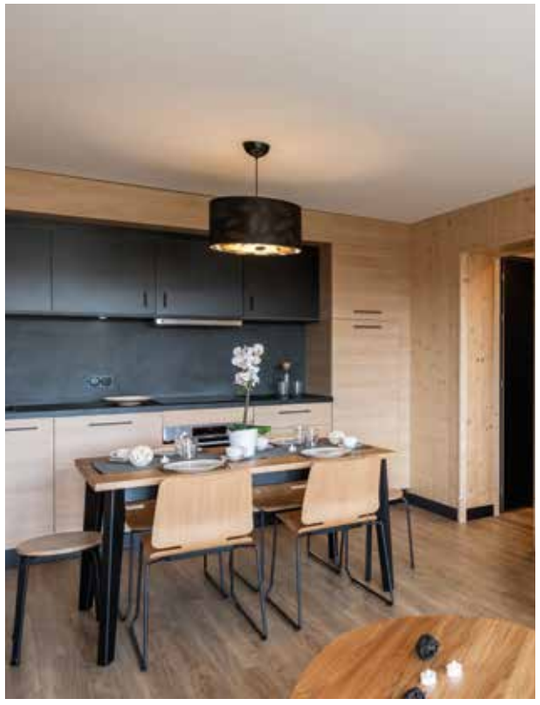
The Gosford Hospital Redevelopment was lately redeveloped to deliver a next-generation health service to the people of the Central Coast thanks to a wide range of new and upgraded facilities. Over 35 000 m² of vinyl coverings were installed in the shower recess areas as well throughout the entire hospital areas including on floors and walls. Concrete substrates were prepared using TOPCEM, NIVORAPID, LATEXPLAN TRADE, PLANIPREP SC. MAPEGUM WPS waterproofing membrane was applied in all wet environments and vinyl coverings in these areas were installed using ADESILEX G19. Vinyl floors installed were applied in all dry areas with ULTRABOND ECO V4 SP and ULTRABOND ECO 380. ROLLCOLL adhesive was used to install the resilient coverings on walls.

Unimed Chapecó Hospital
Chapecó, Santa Catarina (Brazil)

The Unimed Chapecó Hospital, located in the Santa Catarina State, was founded in 2019 and set a benchmark in Brazil's modern health institutions. It covers an area of 13,000 m², divided into five floors and hosts 55 beds, an Emergency Room, diagnostic facilities, and oncology and physiotherapy units. The principle of eco-sustainability lies behind the choice of several building materials, such as the resilient floors. PRIMER G, synthetic resin-based primer, was used to treat the substrates; ULTRAPLAN ECO, self-levelling, ultra quick-hardening compound, was chosen to smooth them; ULTRABOND ECO V4 SP FIBER fibre-reinforced adhesive ensured a fast, easy and safe application of the rubber floors supplied by Nora.

Étoile des Sybelles
Le Corbier, Savoie, France

Situated in the heart of the French Alps at an altitude of 1,550 m, the Étoile des Sybelles tourist complex, which extends over an area of 10,000 m², is 8 storeys high and has 99 apartments and suites, a bar and dining area, an entertainments hall, a wellbeing and fitness area and a swimming pool. The LVT flooring was installed over a total area of 7,000 m² with ULTRABOND ECO V4 SP universal adhesive in water dispersion with very low emission of volatile organic compounds (VOC). For this 100% modular wood project, 310 modules were assembled in the workshop of Ossabois before being assembled on site. This process enabled a strong economy of CO_2, a significant reduction in waste and a huge saving in time.



© Ossabois Lotfi Dakhi

Supporting great music

MAPEI WILL BE ONCE AGAIN WORKING ALONGSIDE IMPORTANT MUSICAL INSTITUTIONS IN THE 2022/2023 SEASON

LA SCALA THEATRE IN MILAN

Mapei is continuing to support the La Scala Theatre in Milan as one of its Founding Partners. The 2022/2023 season was presented on 6th June and will open with a cornerstone of the Russian repertoire, Modest Musorgsky's *Boris Godunov*, conducted by Riccardo Chailly. The opera will kick off La Scala's lengthy schedule of "about 90 evenings of opera and a number of concerts and ballets just like previous years", so CEO Dominique Meyer explained.
Mapei is organising five evening events for its guests this year: 9th March with the opera *Adriana Lecouvreur* by Francesco Cilea, 5th April with *Don Giovanni* by Wolfgang Amadeus Mozart, and 19th May with *Un ballo in maschera* by Giuseppe Verdi; these will be followed by the Ballet *Onegin* on 20th September and the opera *Fedora* by Umberto Giordano on 27th October.
Mapei was a partner of the special concert by the West-Eastern Divan Orchestra held on 6th May that was conducted by Maestro Thomas Guggeis (in the photo on the left with Mapei's CEOs Veronica and Marco Squinzi), a young German conductor and pianist who took the place of Maestro Daniel Barenboim who was unwell. Mapei has invited about 50 guests to these evening events, who all get the chance to enjoy the performances followed by a light dinner hosted in the theatre.

© Teatro alla Scala Brescia/Amisano

© Musacchio, Ianniello & Pasqualini

ACCADEMIA NAZIONALE DI SANTA CECILIA IN ROME

Mapei also renewed its support as a Founding Member of Accademia Nazionale di Santa Cecilia. A press conference was held on 22nd April to present the forthcoming musical season. "It will be a period of reopening and consolidation. After all the disruptions caused by Covid-19 over the last couple of years, we have to draw the public back in with the help of high-quality performers and an eye-catching schedule of music", so the Academy's President-Superintendent Michele Dall'Ongaro noted when presenting the new season, Antonio Pappano's last as music director. The Anglo-Italian maestro will be made the orchestra's Director Emeritus and open the new season on 18th October by conducting Richard Strauss' *Elektra*.
Mapei supported Maestro Daniele Gatti's (*in the photo on the middle*) concert held on 24th February as the Sole Partner and organised an evening event for around 60 local clients. On occasion of the opening of its offices in Rome, the company also organised a second evening event in conjunction with Maestro Jaap van Zweden's concert on 26th May, inviting around 100 local clients from the area. In the photo on the right, Marco Squinzi with Michele Dall'Ongaro.

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A scholarship named after Giorgio and Adriana Squinzi

SUPPORTING AIRC FOUNDATION IN ITS RESEARCH ON CANCER

Andrea Costamagna is the winner of the scholarship named after Giorgio and Adriana Squinzi.

The Mapei Group decided to finance a three-year scholarship at the AIRC Foundation for Cancer Research. The scholarship is named after Giorgio and Adriana Squinzi, the Group's former CEO and Corporate Operational Marketing and Communication Director, and it is intended to be used to train a young researcher and support a research project in the field of oncology. This continues the support for research undertaken by Giorgio Squinzi and his wife Adriana during their many years at the company. It is with great pride that Mapei has decided to commit alongside AIRC to support talented young Italian researchers. A project based on the belief that a business must have its own definite place in society and assume its ethical, scientific, human and cultural responsibilities, as Giorgio and Adriana Squinzi were firmly convinced.

The winner

The winner of the scholarship funded by Mapei is Andrea Costamagna, who will thereby be able to pursue his research project entitled "Role of p130cas in pancreatic cancer: initiation and sensitivity to PI3K targeted therapies"' at the University of Turin under the supervision of Prof. Paola Defilippi. The project focuses on a study of the p130cas adaptor protein and its involvement in the development of pancreatic cancer. A serious disease that affects over 14,000 people every year, making it the fourth leading cause of death from cancer in Italy. Costamagna, who is 29 years old, discovered his vocation for science while at high school during a visit to the biotechnology laboratories in the University of Turin. Here, in 2016, he was awarded his master's degree in molecular biotechnology. In February 2021 he was awarded his PhD in biomedical sciences and oncology, also at the University of Turin, where he is continuing his research work.

About AIRC

The AIRC Cancer Research Foundation is a private non-profit organisation that was founded in 1965 by researchers from the Milan Cancer Institute, including Prof. Umberto Veronesi and Prof. Giuseppe Della Porta, with the backing of Milanese business people. For 57 years, the Foundation has been committed to fundraising for research projects carried out at university laboratories, hospitals and scientific institutes; furthering the training of young researchers through scholarships and special projects; supporting IFOM, its intramural institute of molecular oncology; raising awareness and informing the public about progress in cancer research and promoting the importance of prevention and early diagnosis in homes, squares and schools. AIRC relies on 4.5 million supporters, 20,000 volunteers and 17 regional committees to provide over 5,000 researchers with the resources they need to get results from the laboratory to the patient as quickly as possible. In 57 years of dedicated work, AIRC has raised almost 1.7 billion euros for research projects carried out all over Italy; almost 142 million euros to training grants for young researchers; 282 million for IFOM.

One of the gardens named after Mapei is in Rotonda Cadorna in Milano Marittima.

50 years of Cervia Garden City

AN IMPORTANT MILESTONE FOR THE EVENT SPONSORED BY MAPEI

Cervia Garden City-May in Bloom, Europe's largest outdoor floral art exhibition, is celebrating its 50th anniversary and is more popular than ever. The themes that have always appeared in its flower arrangements touch on issues like environmental protection, peace as a means of international dialogue, as well as brotherhood between nations, sustainability and urban biodiversity. All-encompassing themes that are the leitmotiv of the sixty or so outdoor floral compositions in various locations in Cervia and Milano Marittima (Central Italy) on show until next September. A procession of sculptures, compositions and patterns that can be admired as you wander around the gardens: a feast of flowers and colours for an event that Mapei has supported since 2006.
Three gardens set up in Milano Marittima have been named after Mapei this year: one in Rotonda Cadorna and two in Treffz Park, one of which is dedicated to Adriana Spazzoli, Mapei Group's Operational Marketing and Communication Director until she passed away in 2019, who always supported this event with great enthusiasm.

The Treffz Park hosts two gardens named after Mapei.

Outdoor floral art

The event was first held in 1972 under the name 'Maggio in Fiore' (May in Bloom) and featured a cutting-edge theme back then: safeguarding greenery and nature. Based on an idea thought up by Germano Todoli and continued by his son Riccardo, it has become an increasingly international event over the years. In the 1990s, the exhibition was renamed "Cervia Città Giardino" (Cervia Garden City), so that it could be extended to last almost an entire year and to link it to the historical roots of a "Garden City".
Over the course of five decades, master landscapers from hundreds of European cities, organisations and associations have given free rein to their creativity, creating authentic outdoor works of art.

ReStelvio
MAPEI 2022

Everybody is a winner

THE EVENT IN BORMIO ATTRACTED BIG NUMBERS AGAIN IN WAKE OF THE PANDEMIC

Mapei works closely with major sporting events. Once again, this year it sponsored the Re Stelvio Mapei, a "combined" event (cycling and running) starting from Bormio at an altitude of 1225 m and finishing at Stelvio Pass at an altitude of 2757 m. Competitors in the event covered 21.2 km overcoming a high gain of 1,553 m. This is quite remarkable (and challenging) considering that it is just one climb, and the gradient is constant over almost the entire distance.

A village was set up at Bormio Sports Centre where the races all started with a special area for collecting race bibs; the Mapei Motorhome was also located here, a big attraction for Mapei guests who could contact company staff present in Bormio for anything they needed.

More than 1,000 people taking part in the 'climb' signed up through the Mapei website using the special code reserved for Mapei clients and *Realtà Mapei* contacts. There were also lots of guests from countries where the Mapei Group has subsidiaries, such as Slovenia, Croatia, Sweden and Poland. "The support from our clients was remarkable", so Veronica Squinzi, Mapei's CEO, noted on this matter.

The enthusiastic involvement of Mapei guests contributed, as always, to the colourful festive winding procession invading the streets of Bormio every year on foot and different types of bikes.

A 'pasta party' was held at the village, where the prize-giving ceremony took place, so everybody taking part could enjoy some good food after completing the descent from the top of the mountain pass. The finish area and long stretches of the climb were painted Mapei blue with banners, flags, inflatable arches and panels.

The Unione Sportiva Bormiese organised the Re Stelvio event for the 37th time and Mapei has been the sponsor of the event since 2005.

APPLAUSE FOR THE WINNERS

Clearly the Re Stelvio Mapei is a real festival of sporting endurance. Mattia Gaffuri won this year's cycle race, covering the distance in 1 h 3' 23", beating Luca Vergallito by 12". Third was Patrick Facchini at 1'58" who has a good track record in competitive cycling. In the women's event, Samantha Arnaudo won in the excellent time of 1 h 15' 26". Monica Trinca Colonel finished 9 minutes behind in second place, while Giorgia Bandini came third a further minute behind.

The event also included a non-competitive bike ride in memory of Aldo Sassi, the co-founder and former

The start of the cycling race.

The start of the bike ride.

The start of the running race and the prize-giving ceremony.

Director of Mapei Sport Research Centre. Top of the rankings in this event was Davide Trentini ahead of Matteo Maroni and Giorgio Ferrara. The first three women were Laura D'Urbino, Carla Antognozzi, Patrizia Panizza. In the competitive running race, Matteo Bradanini (1 h 34' 3") won by 14" over Michele Belluschi, with Francesco Mascherpa in third place almost a further 3 minutes behind. Ivana Iozzia dominated the women's race; Nives Carobbio came second, and Sarah Aimee L'Epee finished third. As for the open running events, Luigi Rota came first in the men's race, Jacopo Veronelli was second and Mauro Fino third. The women's event was won by Elena Pascolini ahead of Michela Vitali and Monica Redaelli. The cycling event for pedal-assisted bikes is gaining in popularity year by year. There were over 200 entrants in the 2022 edition with Giorgio Pirola winning ahead of Ugo Chiaradonna and Francesco Sormani finishing third.
The women's electric bikes event was won by Corina Granaudo, second place went to Roberta Cerri and Marina De Lorenzi finished third.

GROWING TREND

"The total number of participants in the Re Stelvio cycling and running event', so Mario Zangrando pointed out, Director of the Unione Sportiva Bormiese, "was 2,100. The trend is growing and we are very pleased. Sport and mass events in general are struggling in the aftermath of Covid-10. The cost of living has risen, so it is not easy to get back to the levels of five-six years ago. I always thank Mapei for the enormous boost it gives us". Bormio's Councillor for Tourism, Samantha Antonioli, was the official race starter.
Participants in the Re Stelvio cycling race pedalled alongside the Dutch national short-track speed skating team who were on a training camp in Bormio. The pack also included the Hungarian speed skaters (of Chinese descent) Liu Shaolin and Liu Shaoang.
Omar Di Felice, a writer renowned for his extreme cycling and campaigning for the climate and ecology, also took part.

A HARE AS THE OFFICIAL MASCOT

Collecting official Re Stelvio Mapei jerseys/vests is a must for fans who also wear them at other events. A hare was the mascot appearing on the jerseys and vests of the 2022 edition. They were made by Santini, the famous supplier of the Mapei Professional Cycling Team. "The choice of a hare as the mascot was very apt", so Zangrando went on to say, "because it is a cute animal from our Alps".
90 members of the Bormiese club were among the starters in the cycling and running races. "It took a lot of effort to coordinate the security staff, organisation office, refreshment stations and assistance for all the runners and riders", so Zangrando continued, "More than 300 helpers were involved: volunteers who perform their tasks with great passion. We at the Bormiese club provide refreshment stations along the climb for everybody taking part, as well as a transport service from Stelvio to Bormio for those who have completed the race. The free beer handed out at the familiar pasta-party was a big hit."
Re Stelvio Mapei brings people together of all ages: "The youngest in the race," continues Zangrando, "were boys born in 2009. The 'least young' were born in 1942, including some who can claim they have taken part in all 37 editions of the event".
As always, the Re Stelvio Mapei cycling event for road bikes attracted numerous athletes living in mountain areas who generally take part in cross-country/downhill skiing, running, skating or mountain bike races throughout the year.

GOLF BELOW THE STELVIO

In conjunction with the Re Stelvio cycling and running race in Bormio, golfers competed for the Mapei Trophy. Bormio Golf Club's nine-hole course stretches over 13 hectares. The President is Lorenzo Tomasi and the club boasts 220 members, 20% of whom are women. The Mapei Golf Trophy held in this club has now reached its 17th edition. "We - so Luca Caspani noted, Sport Director of Bormio Golf Club - organise about sixty competitions a year, some in partnership with companies that choose Bormio for hosting their conventions. The Mapei Trophy is one of the events that is closest to our hearts".

A group picture of the winners of the Mapei Golf Trophy held at Bormio Golf Club.

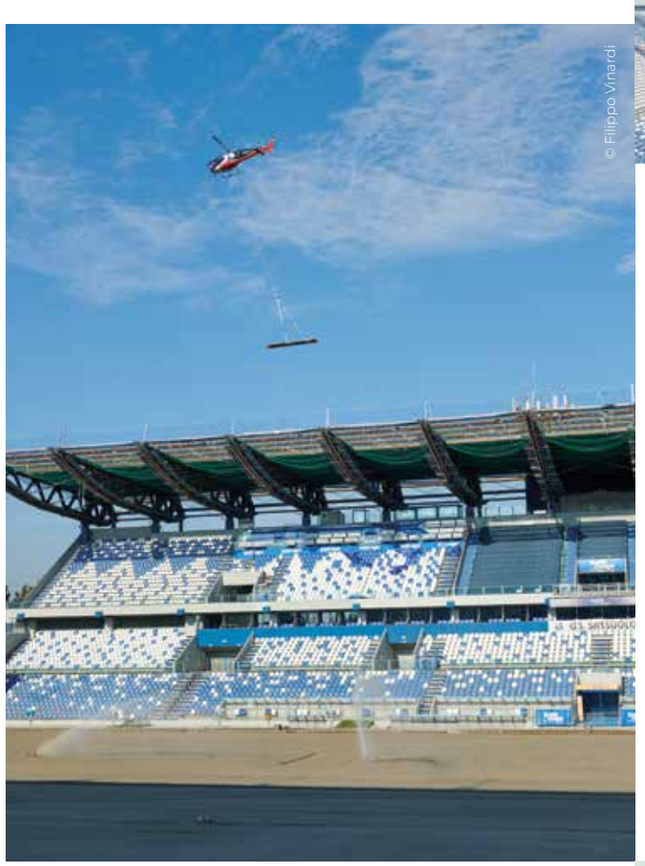
77 contestants took part in the 2022 edition, including some 20 Mapei clients. Amateurs from all over Northern and Central Italy competed in the event.
The main 'gross' category was won by Stefano Sotta who scored 32 points, ahead of the President of the Bormio Golf Club, Lorenzo Tomasi, and Alessandro Terreo (both with 31 points). The winner of the 'net' competition was Filippo Abbà (41 points) with Lorenzo Tomasi and Mario Robustellini joint second with 40 points. The 'second category' was won by Agnese Lucia Sala Danna, who scored 39 points.
She did better than the men; second was Mario Biella (38). Elisa Rampoldi won the leading lady prize and Mario Robustellini was the top senior player. As regards the special rankings, Marco Colombo won the Nearest to the Pin for holes 1/10, Stefano Sotta won the Longest Drive for holes 3/12 and Nearest to the Pin for holes 9/18.
Mapei was represented out on the fairways by Giuseppe Dal Mas (Italy Sales Director), who followed every stage of the competition and awarded the prizes to the winners. Here are the finishing positions for Mapei clients: first Claudio Colombo, second Marcello Zamboni, third Giovanni Mussi.

Back on the field

REINFORCED ROOFS, A NEW PLAYING SURFACE AND SMART TURNSTILES AT THE MAPEI STADIUM

Great things are happening at the Mapei Stadium in Reggio Emilia (Central Italy): the two teams using its playing fields, Sassuolo and Reggiana, will be starting their next championships playing on a new pitch, with smart turnstiles for the fans and refurbished roofs for the East and West stands.
The site, which kicked off at the end of June, was completed in mid-August so as not to interfere with the start of the championship. This is just the latest investment on the stadium purchased around 10 years ago by Mapei, and which since then has become a model facility thanks also to the cutting-edge solutions chosen for the various structures and playing surface.

Refurbished roofs for the stands
The most important intervention from a structural perspective was the refurbishment of the roofs on the East and West stands with the replacement of the existing covers. A new roofing system was installed made from one-piece, overlapping profiled elements the same length as the pitch of the roof (approx. 25 m). A concealed anchoring system was adopted, whereby there are no holes in the roofing sheets or any discontinuities or gaps in the roof. The water-tightness of the system has been tested under all weather conditions and is guaranteed by a special “standing-seam” joint system to guarantee complete impermeability. Also, to prevent any future problems, it was decided to replace the secondary roof structure made up of rectangular, laminated wooden purlins. The purlins were replaced with structural elements made from the same material and in the same form and size as the old ones, maintaining the same metal connection systems as before. This preventive measure was considered necessary due to the difficulty in getting up close or working on each single purlin should any degradation that had not been picked up now come to light in the future. Considering the intensity of rainfall currently being experienced, the guttering around the roofs was also replaced using a larger section. This work included repairs and the replacement of sheeting, flashing, gutters and various fittings.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A few images of the refurbishment works on the roofs and the pitch at Mapei Stadium in Reggio Emilia (Central Italy) that also involved the use of an helicopter to transport the bulding materials.


© Filippo Vinardi

A pitch with even better performance
Work was also carried out on the pitch to improve its performance by replacing the sandy sub-bases and refurbishing the heating system and the mixed, top layer of natural and stitched synthetic grass. No work was required on the drainage system, which was installed back in 2014 using MAPESOIL technology. A survey and a series of analyses were carried out on the pitch which showed that the system was still perfectly efficient, guaranteeing the durability and sustainability of the pitch and stable performance across its entire playing surface without any standing water collecting on it, even in the event of heavy rain.

Turnstiles of the latest generation
Digital turnstiles of the latest generation were installed at the various entrances to the stadium allowing spectators to also enter using their smartphone, thereby simplifying ticket control and speeding up the flow. The TV compound, an area opposite the main stand where the vehicles and equipment required by the media teams to cover the games is located, was also completely renovated. Fans and players can now enjoy all the benefits of this more modern and efficient structure, well up to the highest of international standards.

Redevelopment work has been completed. A more modern and efficient facility for the fans and players

MAPESOIL technology

Natural grass pitches at professional level often have inefficient drainage systems for rainwater and irrigation purposes. This may lead to puddles of water forming on the surface, resulting in the pitch either being unplayable, affecting play and increasing the risk of injury to players if a match goes ahead, or more wear to the pitch and, as a result, higher maintenance costs. The MAPESOIL system can be used to restore the drainage capacity of old sub-bases for natural and/or hybrid grass pitches in less than a month. Unlike traditional vertical drainage systems, whereby the pitch has to be dug out to a considerable depth and a new drainage system installed by laying aggregates and a network of pipes to collect and channel rainwater, with MAPESOIL the pitch only needs to be dug out to around half the depth, resulting in considerable savings in terms of the time required and handling and disposal costs. MAPESOIL technology creates a drainage system distributed across the entire surface without having to install pipework in the playing area: water runs off the pitch through a drainage sub-base made from MAPESOIL VD directly below the sandy sub-base under the grass.

Dionisi: a special season, it will give us new challenges

TEAM MANAGER DIONISI: “I'M NOT WORRIED ABOUT THE WORLD CUP BREAK. MAYBE WE'LL HAVE TWO CHAMPIONSHIPS IN ONE”

Sassuolo's has just begun its tenth season in the Italian Serie A championships. For Alessio Dionisi, 42, it is his second as team manager of Sassuolo. Last season Sassuolo impressed in its away matches against the top teams but was not always so brilliant in home games.

Dionisi, do you get the feeling that in the new season everyone will expect more from you and the players?
"In the 2021 league championship we did great things against the top teams, but against teams theoretically of our level we did not always perform at our best. In the new season we will have to try and be more consistent in all our performances, bearing in mind that it will already be difficult to repeat the good things we did in last year’s championship. Expectations will inevitably be higher, that is just part of being in management or being a fan."

During pre-season training sessions in July-August, did you ask the staff at Mapei Sport to do exactly the same as they did with the players last summer in 2021?
"I talked about it with Sassuolo's technical staff and with Mapei Sport experts. We decided not to do exactly the same preparation as we did in summer 2021 both because the first 3 months will be tougher this season and because of the international break for the World Cup in November-December, an unusual one-off experience. Not that much will change but we have adapted our training loads for the new season with this in mind".

In November, many foreign players, including some at Sassuolo, will go to play in the World Cup in Qatar. And then they'll return to their clubs at the end of December-beginning of January, perhaps injured or with a drop in form. Next season is likely to be strange. Are you worried?
"Worried no, just intrigued and stimulated. When there is something new, it is new for everyone, so we will have to be good at testing ourselves in a situation that no one has experienced before. Having a break in the league championship will be a special experience. It may be that, in terms of performance, for the first time it will be like two championships in one. The first until November, the second from January onwards.”

Even before you joined the club, Sassuolo was a team that boasted a better points average in away matches than in home matches. Do you plan to turn things around an become a team that is stronger at home?
"I don't think managers have a magic wand and I think everyone wants to win points both at home and away. That comes naturally to us because we always try to play the same way at home and away. I would not be so presumptuous to say we are going to change. We will try to improve and win more at home."

Of the players you had in the 2021-22 season, regardless of where they will be from September onwards bearing in mind how long the transfer market lasts, which ones need to improve? And how much can they improve?
"I don't like naming names, so I will just say everyone. The young players because they have less experience and more years ahead of them. The older ones because they aspire to achieve goals they have not yet reached or want to carry on being successful. We all have to improve, me first and foremost."

Alessio Dionisi, team manager of Sassuolo.

NEW KIT AND MAGNANELLI DAY

Sassuolo Football Club's men's and women's first teams are getting ready for the 2022/2023 football season - the club's tenth in Serie A - with a new kit designed by Puma (photo in the middle, left).
The new teams were officially presented on 28th July during Magnanelli Day - an evening to celebrate Sassuolo's legendary captain Francesco Magnanelli, who played for the team right throughout his career helping the team climb up the divisions from C1 to Serie A.
During the event hosted at Stadio Ricci in Sassuolo due to renovation works being carried out at Mapei Stadium, a ceremony was held to retire the number 4 shirt that Magnanelli always wore.
Veronica and Marco Squinzi, Mapei's CEOs, attended the event (photo in the middle, right) and expressed their gratitude for the commitment and passion the captain showed throughout his career and wished both teams the very best of luck for the new season.

Among the current Sassuolo squad, are there any players who will surprise us in February or March? Who will go beyond our most optimistic expectations? Who will be the revelation?
"I believe that some of our young players could show more potential. That will depend on how the whole team plays. Obviously, we hope to make the most of them and to do that we will have to play well".

You have to read every day that many members of your squad are on the verge of leaving for other important Italian or foreign teams.
Do you think that the constant transfer market rumours are a distraction for someone who manages a team like Sassuolo?
'In some respects, it's good to know that you are managing some top players and, perhaps, that you have helped them develop. If they are being talked about, then the credit for that goes to everyone at Sassuolo football club. At the same time, it is hard to manage, encourage and motivate young players in this kind of situation. It would be better to talk about youngsters in a positive way but without getting carried away."

Do you think managing a team that has no commitments in Europe in the 2022-23 season is an advantage over those managers whose teams must also compete on the international stage?
"That remains to be seen, because teams that play in Europe also tend to have bigger and better squads and more financial resources. We can safely say that any Sassuolo manager or player would prefer to be playing in Europe, that’s just normal. It's exciting to aim for Europe but I can’t promise that we'll definitely qualify for international football. We'll try to improve by building on the good things we've done so far."

Golf: the Mapei Trophy between history and sport

THE FIFTH EDITION WAS HOSTED ON THE PRESTIGIOUS GREENS OF VILLA D'ESTE GOLF CLUB

Golf is one of the most popular sports with Mapei's staff and working partners. In early summer 2022 (11st of June), Villa d'Este Golf Club hosted the fifth edition of the Mapei Trophy reserved for amateur golfers. Villa d'Este Golf Club, whose chairman is Alberto Beretta, is located in the borough of Montorfano, a few kilometres from Lake Como. The club was founded 96 years ago and is world famous for hosting several editions of the Italian Open and St. Andrews Trophy. Some of the sport's greatest champions have teed off at Montorfano. The golf club boasts over 400 members. "Every year," so Ivan Noseda told us, a member of the Villa d'Este Golf Club staff, "we organise around 100 competitions and the Mapei Trophy is one of our flagship events. It brings all kinds of people together with competitors ranging in age from 13 to 80". For this event, Villa d'Este Golf Club was decorated with banners and panels with the Mapei logo and a hospitality area was set up for company guests.

The Mapei Trophy was played over 18 holes across the 35 hectares of the Montorfano countryside. "The competitors walked over a distance of six kilometres", so Ivan Noseda assured us. The 2022 edition of the tournament was played using the Stableford scoring system, i.e. with individual rankings determined by points and not strokes. Those taking part included Laura Squinzi, President of the Mapei Board of Directors, Stefano Iannacone, Mapei Group's Regional Director for Middle East and East Africa, and various Mapei clients and business partners from Northern Italy.

Thomas Jacobsen won the 'best gross score' with 32 points. The top category tournament was won by Fabio Molteni with 34 points ahead of Pietro Rampino. The second category went to Paolo Frello (39 points) ahead of Stefania Panebianco in second place (36). There were joints winners in the third category, too, with Rosa Hatz and Sergio Bellazzi both scoring 38 points. The women's rankings were topped by Wilma Varrone (38). The 'top super senior' category was won by Filippa La Gioiosa (36). The 'nearest to the pin' award went to Davide Amati. Prizes were also awarded to Antonio Rossi Polvara (men's longest drive contest) and Sofia Trioni (women's longest drive contest).

The Mapei Golf Trophy was held on the 11st June at Golf Club in Villa d'Este, near Lake Como.

#CYCLING

Mapecoat TNS creates a rainbow path outside the UCI headquarters

A rainbow guides all visitors to the World Cycling Centre (WCC), headquarters of the Union Cycliste Internationale (UCI), in Aigle (Switzerland) and greeted the 2022 Tour de France as it passed through the city on 10th July. The cycling path sporting the rainbow stripes, symbol of all UCI World Championships and UCI World Champions, has been completed using MAPECOAT TNS technology for coating sport surfaces. This new stretch of rainbow, which is safe and comfortable thanks to its non-slip properties, provides a colourful and symbolic welcome to cyclists and pedestrians. The project is in line with Mapei's long-standing partnership with the UCI, which began nearly 15 years ago and will continue this year with the 2022 UCI Road World Championships in Wollongong (Australia).

#CYCLING

Mapei d.o.o. again the sponsor of the Tour of Slovenia

Now in its 28th year, the Tour of Slovenia is the most important cycling event in the country. Since 1993 it has gradually attracted more and more big-name cyclists and fans, as well as acting as an important drawing force for international tourism. From 15th-19th June, the riders covered almost 800 kilometres over five days and five stages. The winner of the Tour was Slovenian champion Tadej Pogačar (see the photo on the right), who rides for UEA Team Emirates. Mapei d.o.o, the Group's Slovenian subsidiary, again sponsored the race that was broadcast live on TV in 130 countries across various continents.

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#FOOTBALL

Mapei Cup in Lisbon

The Mapei Cup is an annual amateur football trophy organised with the aim of strengthening the loyalty of selected clients and the bonds between the staff of Lusomapei, the Group's Portuguese subsidiary, and their business partners.

This year it was held in the FootLab in Lisbon, a facility designed to test a footballer's physical prowess. Eleven teams of six players took part for a total of 66 athletes.

Carla Santos, who has been General Manager of Lusomapei for about a year, was in charge of handing out the medals and cups to the best team and the three best athletes based on the total number of points obtained in the various disciplines. The scrupulous organisation of Luca Sacripanti (Marketing Director) and the support of the entire sales team led by Marco Ferro resulted in this edition of the Mapei Cup being an overwhelming succcess.

NEWS FROM THE WORLD OF MAPEI

EVENTS, SPONSORSHIPS AND PROJECTS BY THE GROUP'S SUBSIDIARIES

USA – A NEW PLANT FOR POWDERS AND ADMIXTURES IN HOUSTON

Mapei Corporation, the Group's US subsidiary, has recently acquired a facility covering approximately 18,500 m^2 for the manufacture of powder building materials and liquid concrete admixtures. The plant is scheduled to be fully operational in 2023 and will enable the company to meet the needs of customers in the southern, western and central states of the country even more effectively, while creating approximately 80 jobs. Mapei Corp. has been operating in Texas for several years through its manufacturing unit in Garland, while other manufacturing plants are being expanded with the construction of new facilities in Dalton (Georgia) and Fredericksburg (Virginia).

SERBIA – MILOŠ TEODOSIĆ PLAYING ON MAPECOAT TNS COURTS

In 2020, Mapei Serbia teamed up with Miloš Teodosić, the famous basketball player, captain of the Serbian national team and member of Virtus Bologna, to launch the campaign "First in the field" - Supreme conditions for supreme results". The campaign is focused on bringing MAPECOAT TNS line for sport surfaces closer to construction professionals, decision makers, end users and general public. Miloš Teodosić, with his personality and attitude, fully corresponds to Mapei values of teamwork, commitment, passion and hard work.

SINGAPORE – A DAY IN THE NAME OF SAFETY IN THE WORKPLACE

On 28th April, Mapei Far East, the Group's subsidiary in Singapore, dedicated a day to the safety of its staff. At the forefront were General Manager Shivram Bagade and Marcel Smit, Regional Director of Asia Pacific for the Mapei Group, who emphasised the company's constant and rigorous commitment to the health and safety of its staff, stakeholders and the places where they operate. Staff were then given an overview of the company's procedures for safety, accident reporting and cleanliness of the work environment, as well as safety measures connected with driving and cyber security.

VIETNAM – HELPING CHILDREN IN NEED OF TREATMENT

Mapei Vietnam contributed to the hospital care of Kim An, a little girl diagnosed with a congenital heart defect and in need of surgery. The family was unable to cover the medical costs, which amounted to around 6,500 US dollars. Thanks to the aid of Vinacapital, a non-government organisation that provides health care for disadvantaged children, the Vietnamese subsidiary was involved in the 'Heartbeat Vietnam' programme that enabled Kim An to be operated on and treated.

QUESTIONS & ANSWERS

ACTIONS TO TAKE FOR APPLICATIONS DURING THE HOTTEST PERIODS OF THE YEAR

by **Marco Albelice**

Using rapid-setting products in the summer

The Spanish physician and writer Gregorio Marañón once said that, "Speed is a virtue that leads to a vice, haste" and, if the slogan "time is money" is true, you can understand how rushing through certain types of work is imperative and, at the same, risky. Working hastily when completing and handing over a site, an apartment, a swimming pool or a house under renovation may push you to not waiting the correct drying times of the various layers of a floor/wall covering system, but this could be overcome by using rapid-setting systems to reduce the waiting times. This may seem a logical solution in the autumn and winter, but what about the hottest periods of the year?

What is the advantage of using rapid-setting adhesives or grouts?
The main advantage with rapid-setting products is the shorter waiting times before putting surfaces back into service. A rapid-setting adhesive needs around 3 days until it is completely set and, in certain cases, the floor/wall system may even be used after just 24 hours. With normal-setting products, on the other hand, you need to wait longer (and sometimes even weeks). Another advantage of rapid adhesives and grouts is that the water contained in them (mixing water) is consumed in just a few hours, reducing or completely eliminating phenomena such as efflorescence or unsightly stains in the joints of tiles or natural stone.

Why are rapid-setting adhesives less workable in the summer?
The answer is obvious: heat makes the water used to prepare the product evaporate much more quickly. And, therefore, the product is less workable and does not dry correctly, provoking cracking and, in many cases, poor mechanical properties. Experience and common sense tell us that, in hot weather, cementitious-based products dry much more quickly than in cold weather. This means that, when the temperature is higher than around 25°C, using a rapid-setting product becomes problematic. We should also consider that surfaces exposed to heat for lengthy periods are usually warmer than the surrounding air.

Are there rapid products available that are not affected by temperature?
There are no products at all that are not affected in some way by temperature. The application temperature for most adhesives and grouts used for floor and wall coverings is from +5 to +35 °C. Modern technology, however, enables products to be formulated which, while still being classed as rapid, guarantee good workability as much as reasonably possible.

What countermeasures can we take with work carried out in the summer?
It is the experience of installers that makes all the difference. By looking at the way they work we can pick up various tricks of the trade and useful suggestions: working in the morning when it is cooler, for example, wetting substrates with a little water, covering surfaces before and, if necessary, after installation and using, where possible, normal-setting adhesives and installation systems. And obviously, putting back work to a cooler period of the year is still the best choice. Mapei has an extensive portfolio of both rapid-setting and normal-setting products and systems to meet the requirements of clients, installers and users alike regarding waiting times before putting surfaces into service, while maintaining the all-important durability of the installation.

Technical Services, Mapei SpA (Italy)

PRODUCTS IN THE SPOTLIGHT

ANCHORING IN TUNNELS, LEVELLING BEFORE INSTALLING LARGE FORMAT TILES, POINTING AND BUILDING LOAD-BEARING AND BUFFER WALLS

1

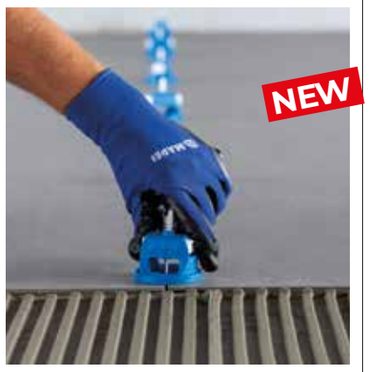
Stabilcem T

ANCHORING AND SEALING IN UNDERGROUND WORKS

Single-component, chloride-free, pre-mixed mortar for injection composed of high-strength cements, micronised silica, expansive agents, fine selected aggregates in granulometric curves and special additives. It is used in underground works for anchoring tie rods and bolts in tunnels, filling cavities and sealing structural joints. When mixed with water, STABILCEM T acquires a thixotropic consistency so that it may used by simply injecting it into horizontal, sloping or overhead sections without sagging or chipping. Thanks to its rheological properties and absence of bleeding, it is able to penetrate even through morphologically difficult soils completely filling even smaller voids.

2

MapeLevel Easyclick System



FASTER AND SAFER LEVELLING

Fast screw tile levelling system for 3-21 mm thick ceramic and stone tiles, with anti-scratch shield included and with a click system for faster application and removal. It can be used on floors and walls and is particularly recommended for the installation of large format tiles. It comprises MAPELEVEL EASYCLICK CAP, a reusable polypropylene levelling cap; a screw spacer MAPELEVEL EASY SPACER L, available in 3 models (linear, T-shaped and X-shaped) which are available in 5 different thicknesses and identified by 5 different colours, to form joints from 1 to 5 mm wide. The system helps installers during tile installation, preventing lippage between adjacent tiles and obtaining perfectly flat wall and floor coverings.

3

Mape-Antique Allettamento

FOR POINTING AND BUILDING MASONRY OF ALL TYPES

Pre-blended, cement-free masonry mortar in powder form made from natural hydraulic lime, Eco-Pozzolan, natural sand, special additives and micro-fibres.
It is used for transpirant installation layers and pointing on internal and external stone, brick, tuff and mixed “natural finish” load-bearing and buffer walls, including those of historical and architectural interest.
MAPE-ANTIQUE ALLETTAMENTO can be used for new load-bearing and buffer walls or for rebuilding old walls.
It has an extremely low rate of hygrometric shrinkage which drastically reduces the risk of the formation of cracks in the mortar and is resistant to various chemical-physical aggressive phenomena.

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