THE MAGAZINE FOR
EMPLOYEES AND CUSTOMERS
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MC aktiv

MC Report

Powering ahead

MC power plant expertise in global demand

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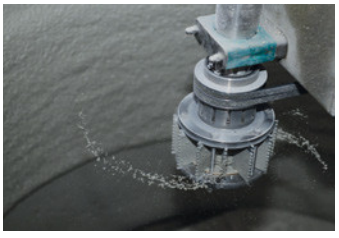

MC Innovation

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Dear Reader,

Global energy demand is set to rise in the coming decades, with further shifts in the energy mix towards more regenerative sources. It will only be possible to satisfy this increase in demand by building new power stations and upgrading, modernising and repairing existing facilities. This is where the competence of our Energy & Renewables FoE (Field of Expertise) comes into play, a unit in which we have pooled more than 50 years of experience and expertise in the power plant sector. The main story in this issue of MC aktiv provides you with a small insight into our globally sought-after capabilities in this area.

In the power plant industry and many other sectors, our product systems represent high-quality construction, reliable waterproofing and durable repair and protection. This issue illustrates another broad range of applications, from refurbishing the fair-faced concrete façades of La Seine Musicale in Paris and the heritage-compatible restoration of the Gedächtniskirche (Memorial Church) in Berlin, through to construction of the Hilton Garden Inn in Ghana and the waterproofing of structures in Slovakia and Poland. Our partners are able to rely on our ability to consistently provide intelligent, high-quality solutions, backed by individual advice and innovative product systems, two of which you'll be able to read more about later in this issue.

As ever, we round off our MC aktiv with news relating specifically to MC and its people.

We wish you an enjoyable read!

Kind regards,

Dr.-Ing. Claus-M. Müller

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Cover Photo

View from below a cooling tower in Niederaussem (Germany) which, at 200 metres high with a base diameter of 145 metres, is the highest natural-draught stack of its kind in the world. Products and admixtures from MC ensure that the high-performance concrete used in the structure offers exceptional resistance against acid attack.

Photo: MC-Bauchemie, Bottrop (Germany)

Credits

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Verni employees at the MC/Verni stand at the "African Construction Expo & Totally Concrete Expo 2017" held in Johannesburg at the end of May 2017.

MC's distribution partner in South Africa

MC has concluded an exclusive partnership agreement for MC injection systems in South Africa with Verni Speciality Construction Products (Pty) Ltd., a South African provider of construction products for the repair and protection of concrete structures. The South African market is the most advanced on the continent and offers MC good prospects for further expanding its presence in Africa.

In Johannesburg from 19 to 21 April 2017, MC employees met their Verni counterparts from the back office and field sales teams to deliver presentations and training on MC's injection systems. Verni and MC then came together for their first joint exhibition, manning a booth at the "African Construction Expo & Totally Concrete Expo 2017" in Johannesburg, which ran from 23 to 24 May 2017.

Training for Israeli applicators in Bottrop

Applicators from Israel travelled to Bottrop to participate in an Injection & Concrete Repair training course from 18 to 20 July 2017. The event was organised by Wolfgang Litz, Business Development Manager at MC, whose territorial responsibilities include Israel, together with AZ Marketing Ltd, MC's long-standing distribution partner in Israel and itself a manufacturer of building products. The first two days were dedicated to providing the applicators with theoretical and practical insights into the benefits, applications and usage of MC's injection products. The fundamentals of concrete repair were then dealt with on the final day, with the areas covered ranging from damage diagnosis and substrate preparation to repair and surface protection.

MC runs smooth and fast to the finishing line

Sport is a great unifier, fostering team spirit across the generations and beyond departmental boundaries. This was impressively demonstrated by 12 colleagues from MC who, in three relay teams of four, took part in the fifth VIVAWEST Marathon on 21 May 2017. And they posted some great results as they passed the baton along the course through the heart of the Ruhr district, coming in first (3:30:37 hours), fifth (3:44:00 hours) and 32nd (4:37:08 hours). The group photo before the start, taken at the Music Theatre in Gelsenkirchen, shows from left to right, standing: Dr. Jana Schütten, Kevin Buchholz, Markus Lebek, Matthias Rosenberg, Lars Jankowski, Friederike Lange, Christian Fyrk, Felix Elberfeld, Anna Richterich and Saki Moysidis; and squatting: Vincent Oderah and Uta Griesdorn-Kleinkoenen.

La Seine Musicale – a visionary architectural landmark

Paris – a city known for its beauty and culture – has now been enriched even further. After three years of construction, La Seine Musicale concert hall opened its doors in April 2017. Costing 170 million euros, this construction project on the small Seine island of Seguin, west of the French capital near to Boulogne-Billancourt, has already won numerous awards for its bold visionary architecture. And MC made a significant contribution to the external appearance of this prestige build.

The futuristic 36,000 square metre building has an auditorium of 1,150 seats and a performance hall that can take up to 6,000 people. All kinds of music are expected to be played there. There are also rehearsal rooms for musicians, several recording studios, terraces and a restaurant. And from the fourth floor, there is a beautiful panoramic view of the surrounding area.

At the MIPIM exhibition in Cannes, the construction project won the Best Futura Project Award for 2015, and one year prior to this was recognised with the Biodiversity Label. The planning and execution of this major project was a joint effort between the Departement Hauts-de-Seine and the "Group Tempo Île Seguin" consortium, made up of the companies Bouygues Construction, Sodexo, OFI Infravia and the French state television company TF1.

The architecture of La Seine Musicale is reminiscent of a cruise ship. It was designed by Frenchman Jean de Gastines and Japanese star architect Shigeru Ban, master builders who were also responsible for the Centre Pompidou in Metz. The concept includes self-sufficiency in energy supply: the dome-shaped glass façade in the centre of the building harnesses the sun's rays and a photovoltaic sail moves in synchronisation with the sun's movement across the sky.

An overhead view of the glass roof gives the impression of a bird's nest, blending perfectly with the natural environment of the island and the greenery of the building's roof. In contrast to this centrepiece of the construction, the building is enveloped by an imposing façade of impressive aesthetic elegance based on a symbiosis of glass and fair-faced concrete.

High-specification fair-faced concrete façade

Constructing a fair-faced concrete façade is not easy. Optical impairments such as porosities, blow holes, coloration irregularities, shading and clouding phenomena are common and tend to disrupt the overall result. As the quality of the concrete is of vital importance to the appearance of La Seine Musicale, the client and the planning engineers decided to adopt a façade upgrade system, opting for MC's products and expertise.

Strong performance

In January 2017, the contractor Bouygues Construction had a number of test surfaces prepared by various bidders. As the music venue was due to open in just three months' time, the solution had to be as quick as it was reliable, and it was the product systems from MC that ultimately won the day.

The MC system consisted of a fine concrete cosmetic filler from the Emcefix family, the pigmented concrete coating Repacryl and the transparent graffiti protection coating MC-Color Proof vision. It was applied within the shortest time thanks to the efforts of the specialist applicator – Contreat of Belgium – easily beating the competition. Following the success of the test surface, work was begun on the project proper and was soon moving along quickly. Within just eight weeks, over 9,000 square metres of concrete surface had been reprofiled, coated and protected.




The Seine Musicale sits on the Seine like a cruise ship – a beautiful symbiosis of glass and concrete.

Curtain up for Emcefix, Repacryl and MC-Color

Following expert preparation of the substrate, the first phase involved the correction of porosities, blow holes and formwork joints, together with general deviations. This was done using the high-quality concrete cosmetic system Emcefix-Spachtel F, mixed from the three colours – white, grey and anthracite – in order to achieve the required concrete shade. The fair-faced surface was further upgraded with Repacryl to ensure a homogeneous and high-quality finish across the entire area. Here, MC worked with Contreat to develop a special mixture of three Repacryl colours: grey, concrete grey and light grey. In addition to offering excellent aesthetics, the upgraded concrete surfaces are UV-stable, weather-resistant and colour-fast. The concrete surfaces were then coated with the transparent graffiti protection MC-Color Proof vision up to a height of 3 metres, delivering around 3,000 square metres of coverage. This makes the façade easy to clean even for stubborn graffiti – particularly beneficial for buildings accessible to the public.

MC's final crescendo

Finally, around 150 square metres of floor surface in the entrance area of the building complex were coated with MC-Floor TopSpeed. The pigmented, fast-setting roller coating is based on innovative speciality resins that reliably protect the floor. Not only does this deliver an excellent level of scratch and mechanical resistance, it also ensures a long service lifetime and a high-quality finish.

Walter Devue, Regional Manager Western Europe 2, praised the level of cooperation evident between sales employees Lucas Loupe (MC France) and Peter Gaillez (MC Belgium) in working together with Dr. Jana Schütten (Global Product Management Concrete Cosmetics) as well as the planning engineers and the Belgian application firm Contreat. "Thanks to the smooth, international collaboration of all parties, we were able to successfully meet the challenges encountered in Paris within the specified timeframe and with the usual high quality," he said.

Contreat also received training from MC application engineer Uwe Strauch on the application of the system complex used in Paris, which certainly contributed to the project's success. Looking magnificent – both inside and out – this remarkable addition to Paris' skyline opened at the end of April 2017 with a concert by Bob Dylan.

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Left: The fair-faced concrete surfaces were expertly prepared. Right: The first steps in the façade upgrade operation have been completed with MC's concrete cosmetics and retouching systems. The last phase involves applying the transparent graffiti protection coating MC-Color Proof vision up to a height of 3 metres.

View of the finished Aqua Arena of the x-bionic® sphere: Here too, all the buildings were sealed with Nafuflex Profi Tech 2.

Top performance in Šamorín

In the Slovakian town of Šamorín, south-west of the capital, Bratislava, a multifunctional sport and leisure complex has been constructed in the form of the x-bionic® sphere, designed as a paradise not just for professional athletes but also for ambitious amateurs and health and fitness enthusiasts. Top performance in the structural waterproofing discipline was also achieved by the polymer-modified thick bituminous coating Nafuflex Profi Tech 2 from MC.

A unique sport venue

The ambitious project was the result of a joint vision conceived by the influential Slovakian investor Mario Hoffmann and Prof. Dr. Bodo Lambertz, founder of X-Bionic, a brand with an international reputation for innovative professional sportswear.

Located in the centre of Europe close to the international airports of both Bratislava and Vienna, the x-bionic® sphere is a completely unique venue and resort. It offers professional facilities for 27 Olympic sports over a total area of more than 1 million square metres, and has been the official Olympic training centre for the Republic of Slovakia since 2016.

The huge complex includes indoor and outdoor swimming pools, a riding centre, a modern track and field stadium, a first class hotel and conference facilities, together with restaurants, bars, lounges and relaxation areas.

A proven pro in structural waterproofing

In order to waterproof the various buildings and structures, the general contractor, Ingsteel spol. s.r.o., decided on MC's Nafuflex Profi Tech 2 from a product range that already enjoys an excellent reputation based on numerous references in the Republic of Slovakia and beyond.

The main task lay in waterproofing the Aqua Arena – an area of around 8,000 square metres – in which Nafuflex Profi Tech 2 proved to be a strong performer. The two-component, polymer-modified thick bituminous coating is ideally suited to waterproofing vertical, horizontal and inclined surfaces under protective coatings in accordance with DIN 18195. It is highly flexible and crack-bridging, and thanks to its sprayable consistency can also be airlessly applied. Not only does this ensure fast, problem-free application, it also offers a high yield per unit area. The powder component ensures the applied thick-film coating dries quickly, while its solvent-free formula makes Nafuflex Profi Tech 2 particularly environmentally compatible.

Over a period of some three and a half years, application specialists from the company NSM s.r.o. progressed from the Aqua Arena to all the other facilities of the sports complex, including the hotel and the biogas plant. Since that time, Nafuflex Profi Tech 2 has kept the buildings of the huge x-bionic® sphere sealed and dry, providing strong evidence of the high performance capabilities of MC's waterproofing systems.

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Heritage-compatible restoration in Berlin

One of the most important ecclesiastical complexes in Germany, the Kaiser Wilhelm Memorial Church in Berlin serves as a reminder of the Second World War and is a must-see for any tourist visiting Germany's capital. Restoration of the chapel meant ensuring its historic preservation while complying with current regulations and the technical necessities of concrete repair.

A major portion of the church ruins was torn down in the 1950s and replaced by three buildings designed by Egon Eiermann, one of the most significant German architects of the post-war modernist movement. The church complex includes not only the church itself but also the bell tower, the foyer and the chapel. The latter is a steel-framed building clad with precast concrete components which proved to be particularly difficult and technically complex to maintain. Restoration had therefore become overdue.

A challenging task

With the help of the Wüstenrot charitable foundation, the restoration of the chapel, and particularly its façade, was taken from feasibility study to final decision in 2014. The façade consists of concrete honeycombs infilled with some 20,000 coloured thick-glass elements produced by a French glass artist, each of which unique in its own right and assembled together as fragments in the concrete moulds. The concrete quality of the 50 year old building was characterised by a very uneven washed concrete look with aggregates of up to 15 mm in size. The honeycomb construction itself exhibited a very intricate and finely defined geometry interspersed with inclined individual surfaces.

Test and proving phase

At the beginning of 2016, the architectural partnership *abd ewerein und obermann* sent out an invitation to bid for the restoration of the chapel, accompanied by the following repair system specifications:

The appearance of the concrete was to remain largely unchanged, but with its water absorption capacity significantly reduced or completely eliminated. A carbonation-retarding coating was to be provided with as high an sd-value as possible, providing the maximum level of protection available. A sample area was to be renovated in situ, for which MC sales representative Thomas Baumgartner, and MC's Sales Manager for Infrastructure and Industry, Oliver Krause of our Berlin Service Centre, suggested a system complex comprising hydrophobic Emcephob WM combined with a protective coating of MC-Color Proof pro. The latter product easily met all the specified requirements. This transparent concrete protective coating is water repelling yet also offers good vapour diffusion and highly effective carbonation-retarding properties. The product is classified as compliant with the non-trafficable surface protection class OS-B as listed by the Federal Highways Research Institute (BASt). All the material specimens were subjected to a rainstorm test with rear moisture penetration in a trial comprising 50 test cycles, conducted by the Federal Institute for Material Research and Testing (BAM). Completed by the end of June 2016, the laboratory tests provided clear evidence that the multi-component system offered by MC was the most technically reliable and visually attractive of all those examined.

Implementation

The application work was carried out by the firms A&M restore and Repenning + Sohn Bauwerkserhaltung of Berlin and successfully executed by the autumn of 2016. All the accompanying construction activities in the interior were completed by spring 2017, allowing normal church business to be resumed without disruption.

A sensitive, intricate approach was required in order to ensure the heritage-compatible restoration of the chapel and the façade of the Kaiser Wilhelm Memorial Church complex.

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Powering ahead – MC power plant expertise in global demand

The world's hunger for energy is showing no sign of slowing down. Whether fossil, nuclear or regenerative energy, MC has a proven track record of 50 years serving planning engineers, contractors and facility operators as a technology leader and trusted partner in the construction, repair and protection of concrete structures.

Energy – today and tomorrow

In its World Energy Outlook published at the end of 2016, the International Energy Agency (IEA) forecast that by 2040, global energy demand will increase by 30%. Over the same period, the share of regenerative energies is expected to rise from around 23% to approx. 37%. The Federal Institute for Geosciences & Natural Resources (BGR) emphasises in its "Energy Study 2016" that the growing global population and a general increase in living standards will also result in increasing energy demand over the long term. In order to satisfy this hunger for energy, we are seeing new power plants being constructed on every continent, as well as the upgrade and modernisation of existing facilities. As a result, the experience, competence and power plant product systems of MC's Energy & Renewables Field of Expertise (FoE) are very much in demand, and are being utilised in major projects around the world.

MC in power plant construction

Back in the 1960s, MC established its own specialist department for power plant construction in Bottrop, which was able to accumulate a unique level of expertise over the ensuing decades. Under the leadership of Global Target Manager Reinhard Martin, an engineer who has been working in the energy sector for over 20 years, the Energy & Renewables FoE aims to ensure that this expertise is expanded throughout the world. He supports the local target managers of MC's international companies with specialist know-how, promoting knowledge transfer and helping to establish and expand the FoE, while also implementing and supporting major projects.

"As a technology leader in the field of power plant-specific concrete technology, we are able to offer a huge range of solutions," says Reinhard Martin, not without a little pride. "In recent years, we have been able to implement these solutions in a significant number of new construction and refurbishment projects in Asia, Europe and South America." At the end of the 1960s, MC was still focused on classic coal-fired power stations. However, its range of projects and applications has increased as the years have progressed. Today, it encompasses thermal power plants, including nuclear, gas-fired and coal-fired, together with hydroelectric and wind turbine generating facilities. Holger Schwarze, Sales Manager for the Infrastructure & Industry segment in MC's Service Centre West in Germany, is a proven power plant expert with many years of experience in major international projects in the energy sector. He explains: "The thermal power plants currently make up a quarter of our project volume. A further 25% is accounted for by hydroelectric power plants, while the lion's share of 50% is currently being taken up by the wind energy sector."

Still hot: thermal power plants

Although a large number of thermal power plants are getting on in years, the output of these nuclear, gas-fired and coal-fired facilities is still essential for the energy mix – both now and in the future. So it is worth knowing that MC has many decades of expertise as a specialist in the repair and refurbishment of power plant cooling towers and chimneys. These repair and protective measures are becoming increasingly important in order to ensure that facilities can continue to be used in the future. The product systems for such projects have to meet exacting requirements and offer very high resistance values. MC maintains a comprehensive product portfolio comprising admixtures and coating systems that satisfy these demands with respect to resistance to acids, water penetration and hydrolysis, ensuring that the concrete used for power plant construction exhibits the necessary stability, durability and effective protection. These concrete coatings can achieve exceptional service lifetimes even under the extreme conditions encountered in the cooling towers. This is exemplified by the anthracite-fired power plant on the eastern edge of the city of Rostock on Germany's north-eastern coast,

From Germany to China, wind parks to seawater-operated cooling towers, MC's know-how has been incorporated into power plants right across the world.

which was constructed in 1992/93. Remarkably, the cooling tower of this power plant is operated with seawater from the Baltic – with simultaneous flue gas discharge. Combined, these two phenomena represent the toughest of all corrosive stress loads. The cooling tower's inner shell is constantly exposed to water and permanently in contact with acidic condensate, while the cooling water basin and support structure for the water distribution level are continuously exposed to chloride attack. As a result, the cooling towers were coated from the start with a highly resistant surface protection system from MC – both inside and out.

The outer walls of the cooling towers were covered with the protective coating MC Schutzüberzug 702. This ready-to-use fresh concrete sealing agent is an ideal solution, particularly for structures built using the sliding and climbing formwork construction method. It adheres brilliantly to slightly damp substrates, prevents excessively fast water loss, is extensively resistant to chemicals and reliably protects the concrete against aggressive components in the atmosphere such as carbon dioxide. For the substrate of the inner shell and the upper ring beam, the first coating and the levelling coat were provided using Zentrifix F 82 XX, the speciality mortar specifically developed for providing the scratch coat inside cooling towers. This was then covered by a protective coating of MC-DUR VS-NR 3. This highly acid-resistant epoxy resin sealant was also especially developed by MC for use in cooling towers. The subsequent topcoat was provided in the form of the pigmented, colour-fast polyurethane resin sealant MC-DUR VS PUR.

In 2010, when the inner coating of the cooling tower top had to be renewed for the first time, the concrete structure was found to have no damage whatsoever, with no more than a portion of the coating cross section having been consumed. The coating had thus fulfilled its purpose to protect the reinforced concrete, very much to the satisfaction of the operator. As a result, when it came to the repair work, the decision again went in favour of MC's products.

The reputation of the Rostock power plant project has even extended to the Far East. The Hangu power station project in the Chinese harbour city of Tianjin, south-east of Beijing, again involved seawater-operated cooling towers which had been coated in 2008 and 2009 with MC systems inside and out. Because the project specifications demanded particularly durable resistance against water and osmosis, additional protection of the concrete was required. This was particularly true for the reinforcement steel in the cooling water basin and the column and beam construction of the cooling water distribution system, which required products of the MC-RIM range. This sulphate-resistant, mineral surface coating system is carbonation-retarding and chloride-resistant. It offers high levels of protection, particularly at pH values between 3.5 and 14. In Tianjin – as in Rostock – the work was performed to the full satisfaction of the operator, and the project's excellent results meant that the same system was used to protect two further cooling towers in 2016.

High pressures in hydropower

Hydroelectricity is regarded as the classic renewable energy. After all, the first hydroelectric power plant was commissioned in England back in 1880. According to the IEA World Energy Outlook, hydroelectric power accounted for a global energy share of 16% in 2016, casting it as the leading technology in the world's shift to renewable energies. In October 2016, the American Energy Information Administration ranked the top ten most powerful power stations in the world, nine of which are hydroelectric. The biggest generators in this sector are currently China and Brazil. In Germany, hydroelectric power accounts for a little more than 3% of its total energy output, leaving it rather less significant due solely to the topographical conditions of the country. Nevertheless, pumped storage power stations in Germany still make an important contribution to grid stability and supply security by smoothing out peaks in energy generation through intermediate storage.

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Invitation to attend MC's International Energy Symposium

MC's Energy & Renewables FoE invites clients, operators and planning engineers from the energy sector to an International Energy Symposium from 24 through 27 October 2017 in Bottrop, Germany. The programme will include presentations by internationally renowned speakers on various subjects associated with wind, hydroelectric and thermal power generating facilities, together with details of current projects and numerous product demonstrations. If you are interested in participating, please email us at energy@mc-bauchemie.com. The event is limited to 100 attendees.

Plant operators and planning engineers opted for maximum reliability when it came to the repair and refurbishment of the huge Sayano-Shushenskaya dam in Russia, as well as the coating of the cooling towers of the Bełchatów power station in Poland (two photos left). MC know-how also helped in the re-lining of the headrace tunnels that duct the high-pressure water into the Amsteg hydroelectric power plant (photo centre). And in the wind park near Trairi (Brazil), MC systems were used for everything from the foundations and in-situ bonding of concrete components through to the coating of the towers.

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The maintenance and restoration of hydraulic structures using sustainable repair technologies has been one of the core competences of MC for more than 30 years. These product systems serve to upgrade and protect concrete components exposed to the wide-ranging aggressive effects of salt and fresh water, as well as changes in the foundation soil, all of which threaten to create structural weakness in the build materials.

Special solution for the Amsteg hydropower plant

The differing challenges in this sector are illustrated by the Amsteg hydroelectric power station in the Swiss canton of Uri. In the power plant, built in 1922, the water is ducted through two 7.3 kilometre long headrace tunnels through Mount Bristen to a surge shaft high up on the mountain. From there, it thunders down over a height of more than 280 metres to the three Pelton turbines, which generate 450 gigawatt-hours of energy each year. Here, MC product systems were used not just to repair a dam but also to waterproof and consolidate the gradually disintegrating headrace tunnel walls. The tunnels were initially constructed using shotcrete as the lining and already had some serious damage, with spalling and cavities very much apparent. MC's concept, based on injecting the rigid-sealing and reinforcing resin MC Injekt 2700 L, was found to be the most successful solution. Significantly stronger than concrete, MC Injekt 2700 L can be used to reinforce high-rise, civil engineering and technical structures, effectively filling cavities and voids along the way. It also consolidates loose rock and mountain sediment, providing a permanent seal irrespective of whether the substrate is dry, wet or, as in the current case, exposed to water at high pressure. The system satisfies in full the Federal Environment Agency (UBA) guidelines for substances in permanent contact with potable water. Amsteg hydroelectric power station once again demonstrates the importance of MC know-how when it comes to ensuring the sustainable rehabilitation of concrete structures under the most difficult of conditions.

Stability key for wind power plant

Wind power is one of the fastest-growing sectors in the renewable energies field. In 2015, the global output provided by wind power exceeded nuclear energy for the first time. According to annual statistics from the Global Wind Energy Council, more than 54 gigawatts (GW) of wind power was newly installed in 2016. According to the same source, this means there is now around 487 GW installed worldwide, corresponding to a total share of 3%. Some countries already boast high levels of wind power generation within their energy mix, such as Denmark, which covers over 40% of its total energy requirement with wind power, or Germany (16%). However, many countries have virtually zero wind power to fall back on, including major economies such as Russia. A future study carried out by the Council indicates that wind energy could cover around 20% of the world's annual electricity demand by 2030.

In South America too, more and more wind power facilities are being built to supplement the more traditional hydropower resources. Since 2012, Brazil has moved to ninth position among the countries with the world's largest installed wind power capacity. One of its major works is the Santos Energia Wind Power Complex in the north-eastern province of Ceará on the Atlantic coast, a construction project in which MC-Brazil was heavily involved. Since its third phase was commissioned in February 2015, this wind park near the city of Trairi now generates almost 90,000 GW of electricity. Ever since 2011, when Brazil's first wind power project was implemented, MC solutions have been successively introduced into facilities throughout the country. The range extends from admixtures for concrete foundations and precast components, to protection, coating and repair solutions. While MC admixtures ensure the required concrete properties, release agents from the Ortolan product family deliver high-quality fair-faced concrete surfaces. The precast concrete components are reinforced and bonded with adhesive filler and grouting mortars from MC. The crack-bridging, pigmented surface protection system MC-Color Flex is also used to guard against weathering, the effects of UV, thermal cycling and carbonation. This protects the outer walls of these gigantic concrete columns against aggressive elements from the atmosphere – essential for the peace of mind of wind park operators everywhere.

MC's contribution to energy provision

The expertise and experience acquired by MC around the world in the past few decades, complemented by comprehensive consultancy services and high-resilience, high-resistance product systems, provide the company with a significant USP in the power plant sector. By providing this expertise to planning engineers and power plant operators, MC is making its own unique contribution to securing the world's future energy supplies.

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A complete package of MC admixtures, additives and sealing strips is being used in the construction of the Hilton Garden Inn in Ghana.

Prestige project in Accra

Work started in early 2016 on the building of a new hotel in Accra, the capital city of Ghana. The Hilton Garden Inn is a prestige project that represents something quite special, and not just because of its innovative modular construction method. The execution of the foundation was also a first for the West African country and benefited from the use of MC high-tech concrete admixtures.

With well over two million inhabitants, Accra is not only the largest city in Ghana, it is also the country's administrative and business centre. And it is here that Metropolis Development Ltd., a Trasacco Estates Development Company, is to build a high-end hotel for the worldwide Hilton chain.

Special construction method

A key feature of the guest rooms and corridors of the Hilton Garden Inn is that they are assembled on site from ready-built modules about the size of shipping containers. "The modular hotel design is a pioneering project for both our company and the construction industry in West Africa," says a proud Philipp Morris, Head of Operations for the project, adding: "It enables us to greatly reduce the construction time while maintaining a high level of quality."

White tank

The foundation of the new building is also something quite unique in West Africa: German project manager Wolfgang Unruh planned to build the foundation as a "white tank", the first of its kind in Ghana. This means creating a structure of water-impermeable reinforced concrete that requires no additional waterproofing barrier in the groundwater zone.

The requirements for the concrete are extremely high. For this reason, Wolfgang Unruh opted for the expertise offered by MC, which has been present in Ghana since 2016 with its own company and production facilities. Managing Director Noble Bediako and engineer Richard Opoku were not only able to advise the project manager directly on site, they were also able to deliver a complete package, including a concrete admixture and sealing strips for expansion and construction joints for the foundation, pillars and hotel pool.

Installation and compacting of the concrete need to be executed carefully to create the "white tank" of the foundation. For this reason, MC PowerFlow 5100 was used, a plasticiser based on the latest PCE technology, which MC manufactures according to a patented procedure in its own production facilities. Thanks to its outstanding robustness and excellent working properties, MC PowerFlow 5100 is very good for formulating self-compacting concrete. In order to ensure leak-free expansion and construction joints, sealing strips of PVC of the MC Waterstop family were fitted into the concrete.

Strong pillars, leak-free pool

After the work on the foundation had been completed to schedule, attention turned to the main building above the base slab. The plasticiser Muraplast FK 48 was used for the concrete to create the pillars of the building. It enables strong liquefaction and creates a homogenous concrete that is easy to work and requires little compaction. By reducing the water/cement ratio, significant increases in early and final strength were also achieved. Muraplast FK 48 was likewise used together with the waterproofing additive MC-Special DM in the construction of the hotel pool, in order to ensure there would be no leaks.

Once it opens in 2018, the Hilton Garden Inn Accra will offer 286 extremely comfortable rooms, three restaurants, a fitness centre and various business facilities, not to mention a ballroom. Both the hotel's amenities and its innovative construction method will set new benchmarks in West Africa.

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Picture left: The Jordiguhittini gallery in Simplon, Switzerland is protected with Emcephob HPC surface coating in RAL 9010. Picture right: Automated coating work in the Schallbett gallery by Trauffer AG, Brienz.

Safe and bright tunnel vision

The choice of colour in a road tunnel is not just a question of aesthetics, it is a vital safety requirement that is met by Emcephob HPC, MC's surface protection system for tunnel internal coatings. No wonder that constructors in Switzerland are keen to use HPC.

Based on its experiences with easy-to-clean surface protection systems exhibiting anti-graffiti properties, in 2013 MC developed a completely new surface protection system for tunnel internal coatings superior to conventional epoxy-resin-based surface protection systems. Emcephob HPC, a two-component aqueous polymer combination from MC, is a surface protection system that meets the requirements of EN 1504-2. It achieves outstanding results in terms of cleaning and wet scrub resistance and is also non-flammable. Emcephob HPC is completely resistant to light and yellowing, it is easy to maintain and achieves cleaning results that are almost identical to newly applied coatings, even after years of use. Not only do epoxy resin coatings yellow over time, the cleaning requirements are much higher and the quality of colour tone and gloss level steadily decreases after just a few cleaning cycles.

Practical test passed with flying colours

During the product launch phase, MC created numerous test surfaces in tunnels and observed them over several years: for example, in Switzerland in the Schönthal Tunnel (Liestal, 2013), Murgwald Tunnel (Walensee, 2015) and Küblis Bypass Tunnel (2015). The outstanding long-term results displayed by these test surfaces were a key factor behind the decision by the client, Swiss federal roads authority ASTRA, to opt in June 2016 for Emcephob HPC for the coating works in the Schallbett gallery and the Jordiguhittini gallery in Simplon.

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Frosty application in Poland

MC waterproofing systems were applied under extremely harsh conditions in the construction of a medical centre in the village of Kleosin in the Bialystok district of north-eastern Poland.

View of part of the foundation slab that was coated with MC product systems during the harsh Polish winter.

One of the greatest challenges was the timing of the measures for the horizontal and vertical coating of the building and foundation slab, which were scheduled for the winter of 2015/2016. As a result, the ATM Budownictwo project office from the nearby town of Bialystok opted for the winter-resistant OXAL DS-HS and Nafuflex 2K-05 waterproofing products from MC.

Professional waterproofing

Delivery of the materials for the 1,500 square metre foundation slab started in December. First, Oxal DS-HS sealing slurry, which is resistant to frost, sulphates and alkalis, was applied onto the foundation concrete. This layer formed the sealing substrate for the solvent-free, polymer-modified thick bituminous coating Nafuflex 2K-05.

It has highly flexible, crack-bridging properties and with cryoscopic additives is suitable for use even during the winter months. Nafuflex 2K-05 was duly applied in three layers with an overall thickness of 4 mm. Before sealing the entire 1,300 square metres of foundation wall, the substrate was prepared with Oxal SPM barrier mortar and uneven areas, depressions and joints were levelled out. A three-layer 4 mm thick barrier layer of Nafuflex 2K-05 was then also applied on the smoothed wall surface. Finally, a compact heat insulation layer consisting of 10 cm thick, extruded polystyrene foam (XPS) was laid. As requested by the client, MC conducted a training programme for the applicators, MASTER Emil Borys, in order to ensure correct installation. The project was a great success – the waterproofing work went so well that not only were the client and planners extremely satisfied, so were the applicators, who have since used MC products at other construction sites.

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New high-tech mortar for sewage structures

With ombran MHP-SP 3000, MC-Bauchemie has launched a new generation of mineral coatings for concrete and masonry manholes and sewers. Offering exceptionally high chemical and mechanical resistance, they meet the requirements of classification grade B2 / XWW4, the highest applicable to coating mortars according to German standard DIN 19573.

CEM III high-performance cements help raise ombran MHP-SP 3000 to the highest possible exposure class XWW4 (to DIN 19573). This goes beyond the requirements of the well-known exposure class XA3 (to DIN EN 206), the classification standard for concrete resistance. Here the mortar undergoes an ageing test for 14 and 70 days, during which the material is exposed to pH values of 0 and 1. Categorisation is performed on the basis of comparison with the rated destruction of a reference mortar. In this test, ombran MHP-SP 3000 produced outstanding results and was assigned the highest resistance category for use under conditions with pH values < 4. However, continuous service under attack from biogenic sulphuric acid and the ensuing BSA corrosion is not possible. This is because it is impossible for mineral coating mortars to permanently resist pH values < 3.5 (as a useful guide value). In such cases, speciality coatings such as the hybrid silicate compound ombran CPS are required.

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For more information …
… go to
http://bit.ly/2eo9Vgq

New waterproofing slurry for hot surfaces

With Nafutop HT, MC-Bauchemie has launched a single-component, highly flexible and crack-bridging sealing slurry that can be applied to surfaces with temperatures of up to +70°C.

The light-grey, highly flexible sealing slurry is easy to use, offers high yield values and can be readily applied without additional primer with a wide brush, trowel or roller. It can also be spray-applied with the aid of a spiral pump to achieve an even higher yield level per unit area. Nafutop HT offers very high resistance to UV, frost, alkalis/bases and ageing, and is ideal as a waterproofing barrier for prefabricated garage roofs and concrete foundations with high surface temperatures up to +70°C. The new sealing slurry is water-resistant after approximately 24 hours and will bridge cracks up to 0.4 mm wide. It can also be used for lightweight concrete, aerated concrete and masonry, and will also seal render. Nafutop HT has been tested to EN 1504-2 and approved as a surface protection system for concrete structures. The sealing slurry is coatable and can also be plastered or rendered.

Nafutop HT is particularly suitable for prefabricated concrete components and garage constructions, offering simpler, faster and more reliable waterproofing, including on visible surfaces. This saves time, money and accelerates the production process.

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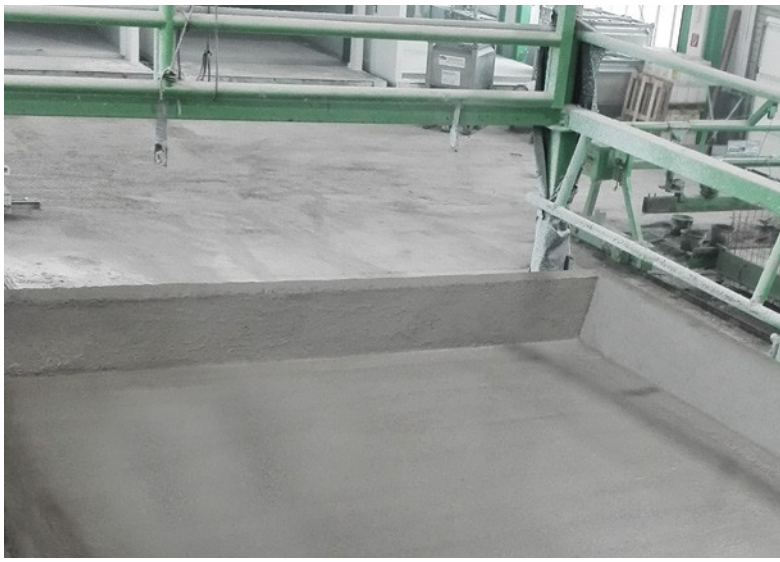
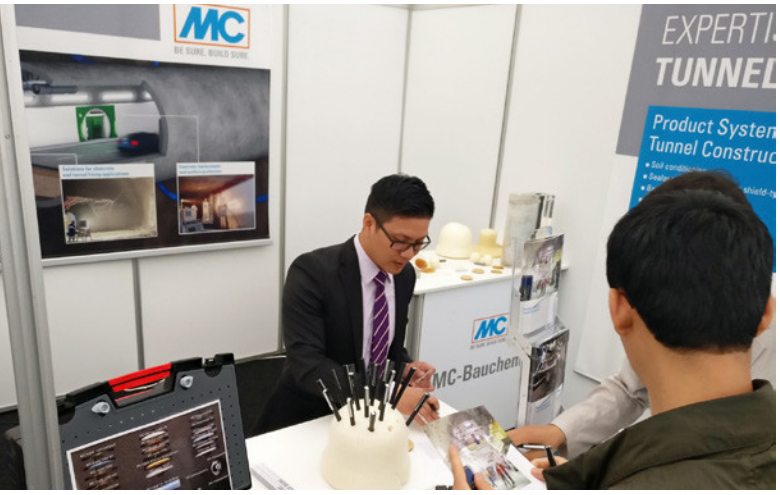


Going underground: MC at RO-KA-TECH

From 10 to 12 May 2017, MC took part in RO-KA-TECH, the international trade fair for sewer, pipe and industrial services. With numerous exhibits and video installations, MC's "Underground Sewer Systems" FoE (Field of Expertise) showcased a number of new and proven system solutions for the sewerage sector. The focus this year was on repairing manholes and large-profile sewers, refurbishing separator systems, waterproofing building structures, and on product application systems using sewer rehabilitation robots. MC experts were also available at the booth to talk to exhibition visitors. A particular highlight at the show was the new MRT truck, which attracted numerous prospective customers to the outdoor area of the exhibition centre.

For more information …
… go to
http://bit.ly/2vPFpCi



Tunnelling competence: MC at WTC in Bergen

From 12 to 14 June 2017, MC's Tunnelling FoE (Field of Expertise) took part in the 2017 World Tunnel Congress (WTC) in Bergen, Norway. One of the most important events for the tunnelling community, the event attracts representatives from the industry, professional associations and science and technology. MC employees exhibited a range of product systems as well as the company's extensive competence in the construction and repair of tunnel structures. This includes concrete admixtures, steel fibre-reinforced shotcrete, soil conditioning agents, backfill mortars, injection technologies, surface protection systems and concrete repair solutions.

For more information ...
... go to
http://bit.ly/2wsBPjK

MC Ghana Forum

From 24 to 28 April 2017, a seminar for building contractors, planners and architects from Ghana was held on the theme of "Concrete: its design, repair and protection" at the MC-Bauchemie Training Centre in Müllerstrasse.

The event introduced participants to the basics of concrete technology and the challenges posed by the manufacture of concrete and its possible degradation. In addition, the concrete technologists from MC showed how it is possible to specifically control the properties of concrete with different admixtures. Waterproofing systems, surface protection coatings and industrial flooring solutions were also explored in detail – both in theory and in practice.

Tunnel breakthrough in Emscher Project

12 June 2017 was one of the most important moments in the history of the Emscher restoration project: With the breakthrough of the two tunnel boring machines into the target pit in Oberhausen, the underground tunnel driving work for the Emscher sewer was declared complete by the Emscher river management association [Emschergenossenschaft]. Construction of the sewer for the future waste water artery of the region started in September 2012 in Dortmund-Mengede. The arrival at the target pit took place in Oberhausen at a depth of around 40 metres – three metres below sea level. MC product systems were used on the various construction sections, not just for underground tunnel driving but also for the tunnel segments themselves. MC employees who had worked on the project since the outset in 2012 were invited to the Breakthrough Celebration.

Welcome to the team

New employees at MC

Florian Nikolaus Fink (48) joined MC on 1 May 2017 as Global Product Manager Injection Systems. With a degree in geology, he gained experience as a project and sales engineer with various companies. For many years, he worked for a manufacturer of injection resins, adhesives and sealants for structural refurbishment, tunnel construction and mining. He now brings this know-how to MC.

Scott Fang (43, right) took over on 1 June 2017 as Finance Manager at MC in Taiwan from Terry Chow (left), who is now enjoying his well-deserved retirement. Fang has many years of experience in the areas of finance and accounting and most recently worked for an international Scandinavian company in Taipei. Nick Varley, Regional Manager Far East, thanked Terry Chow for his many years of service for MC and wished him all the best for the future.

17 trainees start at MC

During August and September 2017, our new trainees started their apprenticeships in various commercial and industrial professions at MC in Bottrop. We are delighted to welcome them to the company. Standing from left to right: Sven Hermens (paint laboratory technician), Lukas Sklenak (materials tester), Roman Semrau (chemical technician), Felix Hodzic (IT technician), Kevin Szewczyk (chemical technician), Lukas Gorgolewski (industrial manager), Fabian Maikemper (chemical technician), Noel Rösner (industrial manager), Daniel Hoffmann (warehouse logistics officer), Anil-Sakir Demir (chemical technician) and Christian Vogel (warehouse logistics officer). Seated from left to right: Nina Olbrich (industrial manager), Amy Kruse (industrial manager) and Milena Mockenhaupt (forwarding and logistics officer). Cem Önder (warehouse logistics officer), Afewerki Kaleab (chemical technician) and Timo Burian (industrial fitter) are missing from the photograph.

"The Rock" Steinberg takes retirement

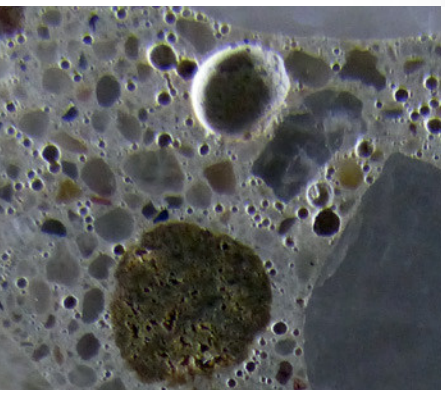
On 8 June 2017, Ludwig Steinberg (2nd from right), CI Sales Back Office at MC in Bottrop, said goodbye to his colleagues as he embarked on early retirement after 37 years at MC. After training as an industrial manager, he started in production scheduling in 1980 and two years later switched to the area of sales/order acceptance, specialising in admixtures, order scheduling and stock-keeping where he remained until this year. Steinberg is a remarkable personality who always worked with great commitment in the interest of customers and was an outstandingly reliable member of staff. We wish him all the best in his early retirement!

Postscript

Unfortunately, in the 3/2016 issue of MC aktiv we forgot to mention Mr Leszek Borowik, Sales Manager Ultrament at MC in Poland, as a long-service employee. We apologise for this oversight and are pleased to rectify it here. Mr Borowik, belated congratulations on your 25 years at MC and all the best for the future! :-)

We give water space to freeze

Centrament Air Polymer



Frost protection for concrete

Water expands as it freezes. When this occurs in concrete, it causes micro-structural damage and spalling. Our solution: Centrament Air Polymer. This new admixture contains microspheres which blend effectively into fresh concrete. In the hardened concrete they create evenly distributed micropores to ensure that freezing water and de-icing agents have plenty of room to expand.

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ADMIXTURES & ADDITIVES

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