

MC

MC-BAUCHEMIE
MAGAZINE 2-2021

aktiv

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powerful, efficient,
sustainable

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Ladies and Gentlemen:

There is no shortage of challenges facing us in these difficult times. One is the coronavirus pandemic. I hope that you have all made it through thus far. We have done everything possible both to protect our people and operations, and to make sure we are still there for our customers.

So far we have been pretty successful on all counts. We are delighted to say that, in addition to all the other operational measures implemented to contain the pandemic, we have also been able to offer a course of vaccinations to our employees. See the next page for more details in this regard.

A further major challenge of our time relates to the energy revolution and the need to make ever greater use of renewable sources. Wind power is set to play a key role in this transition. It cannot be overstated, however, that maximising wind turbine service lifetimes requires the implementation of high-quality systems right from the construction stage. Hence our main feature in this edition is dedicated to wind power, with a review of the current state of the art and what the future holds. This issue of MC aktiv also contains the usual engaging mix of news, inspiration, innovations and project reports.

So – once again – I hope you enjoy the read! And stay healthy!

Kind regards,
Dr.-Ing. Claus-M. Müller

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Credits and legal

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COVID-19 VACCINATIONS AT MC



180 employees of MC-Bauchemie and 80 family members received their first company vaccinations against COVID-19 at MC's premises in Bottrop on 17 and 18 June 2021. Their second jabs were administered on 16 and 30 June 2021.

"We are pleased to have been able to offer a vaccination appointment to all employees in the catchment area of our headquarters in Bottrop who registered with us for their COVID-19 immunisation," said a delighted Nicolaus M. Müller, Managing Partner of MC, in recounting the success of the company vaccination campaign. The MC Coronavirus Crisis Team used a currently vacant building in the Am Kruppwald industrial area in Bottrop to carry out the vaccinations, with the jabs being administered by MC's company physician Dr. Bernd Wiesenhütter and his staff.

Vaccinations offer real protection

"We are very pleased with the organisation and implementation of the vaccination campaign. The feedback from our employees has been overwhelmingly positive. The work of our Coronavirus Crisis Team has paid off, and I would like to thank them once again for their commitment," said Nicolaus M. Müller, adding: "We have come through the coronavirus pandemic pretty well so far – not least because we implemented the right protective measures early on. With this latest campaign, we have further enhanced the level of protection for both our people and our business activities."

PHILIPPINES: MC LAUNCHES OPERATION

Having obtained the legally required approvals from the authorities, MC-Bauchemie Philippines Inc. commenced operations in the spring of 2021.

"The Philippines is a huge country with a population of over 108 million. The growth prospects in the infrastructure and residential construction sectors are immense there," says Dr. Ekkehard zur Mühlen, one of the managing directors of MC-Bauchemie with responsibilities inter alia for the company's activities in the Asian market. He adds: "Moving forward, we too want to participate in these promising developments with our proven chemical products and technologies." Shirley Laurel (55) has been appointed to the post of Managing Director of MC-Bauchemie Philippines. A native of the Philippines, she has many years of experience in the ready-mixed concrete and construction chemicals sectors, having previously worked for various internationally active construction materials manufacturers.



The team running MC-Bauchemie Philippines Inc., with Managing Director Shirley Laurel (3rd from left), in front of the company's HQ in Manila.



For further information, please go to our webpage: <https://bit.ly/3B71AGu>



MC NOW ALSO IN BOLIVIA

With the acquisition on 1 April 2021 of the majority of shares of Linox, a Bolivian company that manufactures construction chemical products, MC-Bauchemie has now also started operations in Bolivia. MC has thus taken another major step in expanding its presence and driving growth in Latin America. The Li-

nox Group, which will be renamed MC-Bauchemie Bolivia SRL, has been operating for over 25 years with branches in Santa Cruz, La Paz, Cochabamba and Oruro, Bolivia's four most important cities. Linox offers the local market an extensive portfolio of sealers, waterproofing products, paints and coatings.



For further information, please go to our webpage: <https://bit.ly/3B7qvJF>



Leipzig velodrome **BACK ON TRACK!**

With a length of 400 metres, the 70-year-old oval concrete racetrack of the tradition-steeped and heritage-listed Leipzig velodrome is the longest of its kind in Germany. Installed back in 1951, the concrete of both the track and the balustrade had fallen into considerable disrepair and was in urgent need of extensive refurbishment. Because there is no standard for the construction and repair of cycling racetracks in terms of their slip resistance and evenness requirements, the only reference available was the successful rehabilitation of the velodrome in neighbouring Chemnitz. And this once again called for implementation of the complete range of MC's repair and refurbishment portfolio – from crack injection, concrete repair, floor coating and joint sealing to surface protection solutions.

With the MC-Floor TopSpeed high-performance coating system to hand, it was even possible to carry out the coating work in adverse weather conditions. MC's product systems thus ensured rapid construction progress between March and May 2021, with timely, on-schedule completion duly achieved. The final finishing touches took place in June, allowing cycle racing on the successfully refurbished track to recommence in July.



For further information,
please go to our webpage:
<https://bit.ly/2WbRMfw>







PRODUCT ROADSHOWS NOW AVAILABLE

Looking for fast response and flexibility in implementing your coating and repair work? Whether it's a new coating you are looking for or the full refurbishment of production areas, warehousing floorspace, corridors, balconies or underground car parks, our robust roller coating MC-Floor TopSpeed can be installed in just a few hours, thereafter quickly developing its full resilience ready for use. Want to be personally convinced? Just contact us to book a free product demonstration (German only) courtesy of the MC-Showtruck – always ready to roll!



For further information, please go to our webpage (German only):
<https://bit.ly/3yeeAZA>



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NEW TOOL AND EQUIPMENT CLEANER

In addition to a very good cleaning performance, MC-Cleaner eco offers user-friendly application and an environmentally friendly eco-balance.

The new tool and equipment cleaning fluid offers an extremely good cleaning effect with a low

dosage. MC-Cleaner eco can be used to completely clean soiled processing tools and equipment that are contaminated with various reaction resins, e.g. epoxy or polyurethane-based or sealants. Since harmful vapours are reduced to a minimum, MC-Cleaner eco has a significantly reduced impact on the working environment as well as the users themselves. And, as mainly renewable raw materials are used for the production of the cleaner, it has a very good eco-balance.



For further information, please go to our webpage:
<https://bit.ly/3gSdMTz>



Dr. Jonas Tendyck
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SOLVENT-FREE JOINT SEALER

The permanently flexible MS polymer sealer Mycoflex 488 MS from MC is now solvent-free and thus practically odourless. It also carries the GEV quality mark Emicode EC1plus, indicating that it is very low in VOC and SVOC emissions. The joint sealer can be used indoors and outdoors and has also been tested for use on pedestrian walkways in accordance with EN 15651-4:2012.



KONUDUR FLEXFIT GETS DIBT APPROVAL

Konudur Flexfit, the special-purpose two-component reactive resin from MC-Bauchemie for manhole CIPP liner bonding, together with the identically formulated cartridge variant Konudur Flexfit CS, were generally approved for construction use at the end of February 2021. The approval body, DIBt (German Institute for Building Technology), confirmed that Konudur Flexfit offers easy workability, high moisture tolerance during application and very fast resistance to water exposure.



For further information, please go to our webpage:
<https://bit.ly/3zdwT1q>



For further information, please go to our webpage:
<https://bit.ly/3mjZjDs>





Multi-storey car parks are particularly susceptible to chloride attack caused by de-icing salt penetration.



Manual application of the zinc layer using the electric arc thermal spray process



The automatic applicator offers a high deposition rate.

CONCRETE CORROSION – HOW TO PROTECT STRUCTURES FROM THIS HAZARD

Chloride attack and carbonation can cause serious long-term damage to reinforced concrete structures such as multi-storey car parks. If left undiscovered, the degradation caused can lead to very expensive rehabilitation measures or even result in demolition. However, if detected in time, cathodic corrosion protection (CCP) can halt the deterioration and help preserve the structure over a greatly extended period.

By far the greater danger is that posed by the penetration of chloride ions. This is caused primarily by the ingress of de-icing salts, commonly encountered in multi-storey car parks, with the contaminated moisture reaching the reinforcing steel of the concrete structure through capillary action. Eventually, the corrosion this causes will jeopardise the entire fabric of the structure. Response then has to be both rapid and effective.

Durable and economical repairs with MC-KKS/B

With conventional repair methods, the chloride-contaminated concrete often has to be removed to beyond the reinforcement. This represents a substantial intervention in the core fabric of the structure and hence is very expensive. In addition to this high cost, the user restrictions imposed during the sometimes lengthy repair work can be very disruptive. By contrast, MC-KKS/B – the globally unique and patented cathodic corrosion protection (CCP – German abbreviation: KKS) system developed by MC-Bauchemie and Grillo-Werke AG of Duisburg, Germany – represents an essentially non-de-

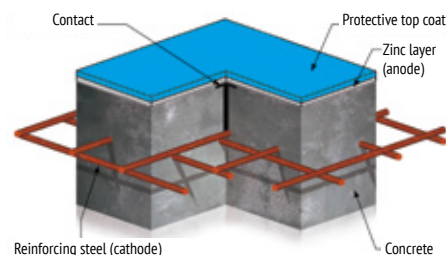
structive and non-intrusive repair method. It enables already damaged yet serviceable reinforced concrete to be permanently and economically preserved in its current, still functionally intact state. The method involves applying zinc – a metal less noble than iron – to the concrete in a layer of about 150 µm in thickness to serve as a sacrificial anode in the electrochemical corrosion process. The zinc layer is connected by contact plates to the reinforcing steel and the electrical circuit is closed by the concrete pore water, thus preventing iron dissolution. Finally, an organic top coat system is applied to the zinc layer to provide mechanical resistance and protect against further chloride and moisture penetration.

Multi-storey car park: Old and new sections growing old together

The MC-KKS/B system has recently been applied to four floors in a free-standing multi-storey car park in Melsungen (Hessen, Germany) which consists of an old and a new steel-framed concrete structure. Around 10,000 m² of the

old section of the multi-storey car park was coated with the MC-KKS/B system. This served to “freeze” the current state of the structure so that the old building and the new building can now grow old together. You will find the full project report on our website – see link below.

Schematic representation of the MC-KKS/B system solution



For the full project report, please go to:
<https://bit.ly/2UxbdhZ>



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Wind power continues to carry our hopes for climate-neutral energy generation. The associated technology has developed rapidly in recent years. Modern, powerful wind turbines now rotate in more than 100 countries around the globe. MC-Bauchemie offers a wide range of high-performance products and innovative systems for the manufacture, installation, protection and renovation of the associated turbine structures.

Wind energy is currently being farmed and commercially utilised in 103 countries around the world. The global output of wind power overtook that of nuclear energy in 2015, since which time it has further extended its lead. In 2018, wind energy accounted for over 8 % of total global electricity consumption. And in the past three years alone, the output of wind turbines erected worldwide has grown from around 590 to over 740 GW. The frontrunners in this expansion are China, the USA and Germany – as they have been for almost a decade now. Wind power is booming – right around the world. In Europe, wind energy now boasts the largest power plant capacity of all electricity generation sources.

A total of 220 GW of wind energy capacity has now been installed in Europe, of which 195 GW is onshore and 25 GW offshore. In 2020, wind turbines in Europe generated a total of 458 TWh, or 16 % of total electricity consumption. In 2020, the share of wind energy in the electricity mix in Denmark, the EU leader, was 49 %, followed by Ireland with 38 % and Germany and the United Kingdom, each with 27 %. And the wind energy industry remains on a decidedly upward trajectory.

MC's "Wind Power" Field of Expertise

For many years now, MC has offered a broad-based product portfolio for this booming market,

from solutions for concrete foundations and precast concrete parts, to high-performance protection, coating and concrete repair systems. MC has pooled all its expertise in the construction and maintenance of wind turbines within its Wind Power FoE (Field of Expertise). In addition to high-performance products and innovative systems, MC's highly qualified team offers comprehensive off- and on-site support with everything from product application training to implementation assistance. The technological progress made since 1979 – when the first series production of wind turbines began in the Netherlands – has been immense. While the output of a wind tower in the 1970s was just a

ENERGY REVOLUTION: WINDING UP THE WIND

POWERFUL, EFFICIENT, SUSTAINABLE



Photo by Apollinar Kalashnikova on Unsplash

OPTIMUM PROTECTION WITH MC-COLOR

Wind turbines are exposed to a variety of attack mechanisms and stresses from salt, abrasion, vibration and movement that can damage the structure. With MC-Color high-performance coatings, the concrete of wind towers can be permanently protected against such phenomena. The MC-Color Flex product line offers pigmented, highly flexible and crack-bridging coatings for the protection of external concrete surfaces exposed to the elements.

Characterised by their cold flexibility, MC-Color Flex products are also open to water vapour diffusion and highly resilient. With our technical advice and support backing up our product offerings, we provide our clients with the best technical solutions available to sustainably protect their structures and provide them with increased durability.

few kilowatts, the 1980s and early 1990s saw technological advancement from small (50 kW to 150 kW) to medium-sized wind turbines (500 kW and 600 kW). The start of the new millennium then heralded the advent of the megawatt class. Newer wind farm installations are typically rated at four to six megawatts – enough electricity to supply several thousand households.

Technology unchained

In the last 20 years, the technical development of wind power generation has mainly focused on the construction of ever larger turbines in order to achieve higher outputs per unit. By 2020, the average rotor diameter of new turbines in Germany had grown to 122 metres and the average hub height to 135 metres. But there was no stopping there: In order to achieve a high power yield even in areas with less wind, more and more so-called low-wind turbines have been erected in the recent past. Such units now have rotor diameters and hub heights of over 160 metres.

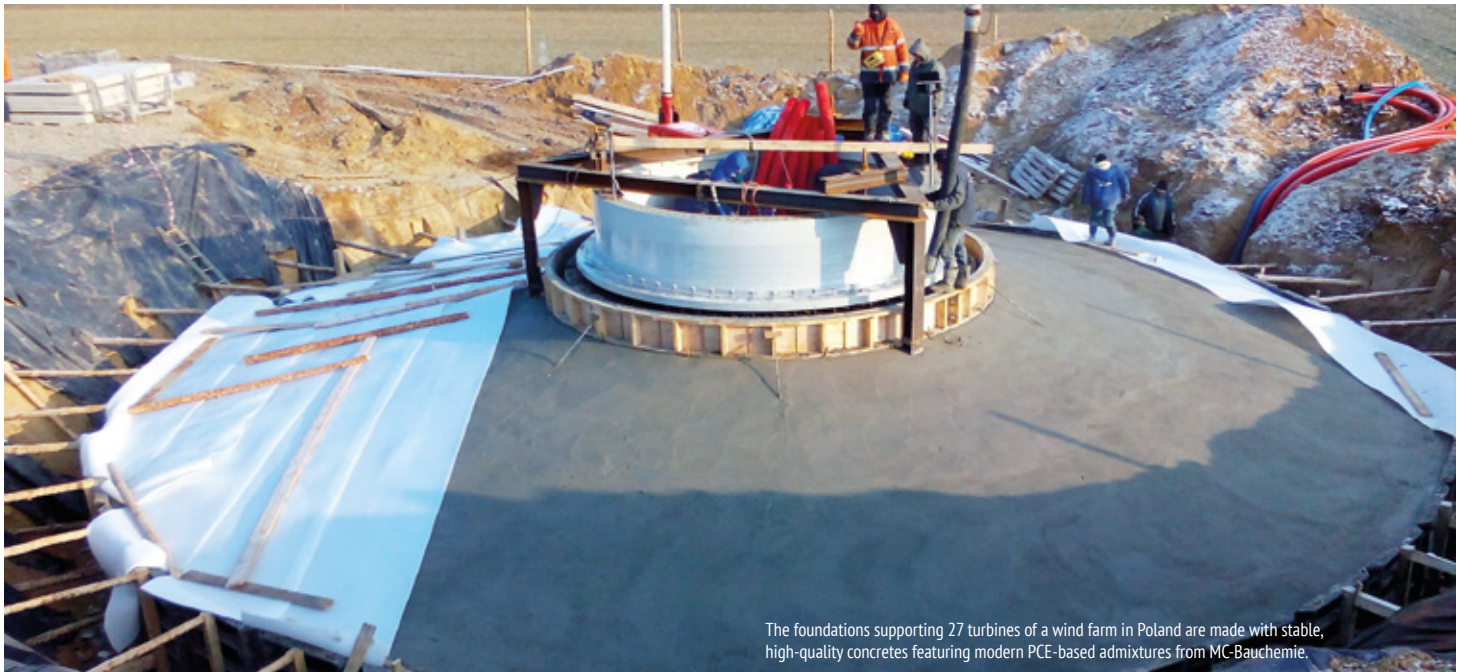


Placing the first ring on the foundation of a wind tower.



For further information,
please go to:
<https://bit.ly/383uKtB>





The foundations supporting 27 turbines of a wind farm in Poland are made with stable, high-quality concretes featuring modern PCE-based admixtures from MC-Bauchemie.

Base challenge

Such tall towers bring high demands on structure construction, starting with the laying of the foundation. When a wind turbine is erected on land (onshore), a round base made of steel-reinforced concrete is created which, due to its weight, lowers the overall centre of gravity of the structure. In addition, its diameter moves the tilting edge of the wind turbine so far away from its centre of gravity that the turbine cannot be overturned even by maximum wind forces acting on it. For example, for a turbine with a hub height of 141 metres and an output of 2.4 MW, the diameter of the foundation is 22 metres and the depth up to 4 metres. This means that around 1,300 cubic metres of concrete and 180 tonnes of steel will be required for its construction. Challenges associated with the large quantities of concrete involved – such as the high heat of hydration produced – and also adverse weather conditions during the construction phase can be effectively overcome with admixtures from MC such as the multifunctional superplasticisers from the Muraplast product line or the hardening retarders from the Centrament Retard range. And to avoid difficulties with the rate at which the concrete sets, MC also offers a wide selection of Emcoril curing agents.

Hybrid towers: Precast concrete components with optimised properties

MC products also increase productivity and performance in the manufacture of precast concrete components for wind towers. In the past, the towers were mainly made of steel, but today hybrid towers are increasingly the norm for tower heights beyond 100 metres. Steel tube towers of this size are no longer economical because of the material and maintenance costs involved. Hybrid towers, on the other hand, consist of concrete elements with a steel extension at the top. In the lower part, precast concrete elements – mostly tubular half-shells – are assembled and vertically prestressed with tension cables. Towards the top,

the construction transitions to flanged steel tubes. With the high-performance PCE-based plasticisers of the MC-PowerFlow product range, Muraplast superplasticisers and also the latest generation of MC-FastKick hardening accelerators, MC provides admixtures for all requirements in the production of the precast concrete elements described.

Secure connections between concrete elements and bearing blocks in the foundation

Success in the construction of a wind tower also depends on ensuring a secure, rigid connection and bond between the precast concrete elements, together with effective curing of the grouting and sealing materials used. Emckrete 80 and MC-DUR 1300 Plus offer the best technical properties for these applications and will even reduce crane operating times. MC-AnchorSolid E820 is the first choice for anchoring and bonding the zero-adjustment bearing blocks on the foundation of the enormous wind turbine masts, and also for grouting the resulting cavities. This highly reactive anchor adhesive has proved to be particularly durable and resistant. As a ready-to-use, two-component product based on epoxy resin, it is especially suitable for anchoring threaded rods and reinforcing steel in both dry and water-saturated, uncracked concrete. MC-AnchorSolid E820 is approved as an anchor bonding adhesive according to European Technical Assessment ETA-15/0506 and has been tested compliant for use in C 20/25 to C 50/60 concrete for anchoring threaded rods and reinforcing steel for mounting attachments. Even under demanding climatic conditions, with outside temperatures of up to 40 °C and high humidity, it has been proven to meet all requirements in relation to strength and tolerance.

Durable protection against external attack phenomena

Wind turbines are not only exposed to permanent stress loading due to vibration and movement; depending on the location, there may be additional

attack phenomena arising from salt and abrasion that can damage the structure. With high-performance coatings from the MC-Color product range, the concrete of wind towers is able to permanently resist the effects of wind, CO₂ and chlorides. MC-Color products are open to water vapour diffusion, flexible, highly resilient and fast-curing. The multitude of high loads and stresses to which a wind turbine is subjected in the course of its operating life means that concrete damage in the structure is always a possibility. And MC's concrete replacement systems have all the attributes to provide the right repair solution. Indeed, MC's Nafufill series is capable of meeting a wide range of requirements when it comes to reinforcing the damaged concrete of a wind tower, should the need arise. With Nafufill LM, Nafufill KM 220, Nafufill KM 230 and Nafufill KM 250, MC offers four repair mortars that not only fulfil the requirements of EN 1504 Part 3, but also give the planner peace of mind in the face of such critical refurbishment undertakings. MC likewise offers globally unique, effective, high-performance injection systems in the form of the MC-Injekt product family, enabling cracks and cavities in wind towers to be safely and permanently closed and sealed so as to avoid critical consequential damage.

Wind power will continue to be an indispensable part of the energy mix worldwide for a long time to come – especially in view of global efforts to effectively and permanently reduce CO₂ emissions. And that means that ever greater importance will be attached to the construction, protection and repair of wind towers. There is an urgent need to keep wind farm rotor blades around the globe constantly turning so as to ensure maximum cost- and resource-efficiency.



Reinhard Martin

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WIND POWER IS HERE TO STAY!

“We offer our customers all the benefits of single-source supply.”

Reinhard Martin

Electricity generation from wind power has great potential worldwide and – given the political imperative of reducing CO₂ emissions – is destined to play an ever greater role in the energy mix in the coming decades. We spoke about the importance, potential and advantages of MC in relation to wind turbine construction and repair to Product Line Manager Reinhard Martin who has been with MC for more than 30 years now and has extensive know-how in MC's Field of Expertise Energy.



In the spotlight

“To avoid high repair costs in the future, it makes sense to use high-quality systems in the initial build.”

Mr. Martin, what role does wind power have in our energy mix?

Last year, wind energy accounted for 31 % of electricity generation in Germany. Although expansion has stalled in recent years, Germany, with an installed capacity of 63 GW, is still one of the world's largest wind power producers alongside China and the USA, and leads the way in Europe. Globally, the percentage share is significantly lower, at just under 6 %. However, this means that there is still a great deal of untapped potential here. Including for MC!

What specific opportunities do you see arising in the next few years?

Germany's consumption of electrical energy in 2020 amounted to 554 TWh. Regardless of all efforts to save energy, demand is expected to rise to 665 TWh in the coming years. Meanwhile, we are phasing out thermal energy generation from nuclear power and coal. And these disappearing capacities will also need replacing. With demands to reduce CO₂ emissions across

the globe, the share of fossil fuel-fired facilities is also destined to decline on the international front. Other countries may see different options, depending on the availability of water and sun. However, as things stand at the moment, wind power is very much here to stay.

And that means we have a highly attractive field of activity with huge potential in the coming decades, not least in South America and Asia where the conditions for the generation of electricity by wind power are very good and where we are also represented with local organisations.

Where will future developments take us?

Wind power will continue to play a key role in the process of energy transition going forward. Onshore, the trend is to build ever larger and taller turbines to improve efficiency. Of course, this also places higher demands on the building materials used. Offshore there is even greater potential to be tapped in the future.

Wind turbines have a planned life cycle of 20 years. What advantages can MC offer the operators of such facilities?

Maintenance work is notoriously difficult to carry out on a wind turbine that is still in service. And when it comes to the tower particularly, such activities are extremely costly. So – to avoid this expense – it makes good sense to use high-quality systems for both construction and surface protection. We offer these systems!

And should there be a need for repair, we are able to shorten downtimes and reduce power production outages with structurally strengthening mortars, high-quality grouting solutions and innovative coating systems such as those featuring our KineticBoost® technology. Our customers enjoy all the benefits of single-source supply for everything from the installation of foundations and precast concrete segments to waterproofing, surface protection and innovative repair systems.

The R&D team of MC-Bauchemie Ghana standing with Dr. Wolfram Schmidt (in the middle), coordinator of the INFRACOST project and member of the Federal Institute for Materials Research and Testing (BAM), and with Noble Bediako (2nd from right), Managing Director of MC-Bauchemie Ghana.

PROMOTING SUSTAINABLE DEVELOPMENT ACROSS GHANA'S CONSTRUCTION SECTOR

MC-Bauchemie is involved in the German-Ghanaian INFRACOST project, which is funded by the German Federal Ministry of Education and Research (BMBF) as part of the "CLIENT II" initiative. In short, INFRACOST is about adapting concrete infrastructure and the built environment in Ghana to ecological challenges and risks, and ensuring that the associated structures can be maintained on a sustainable footing.

Eine Initiative des Bundesministeriums für Bildung und Forschung

CLIENT II
Internationale Partnerschaften für nachhaltige Innovationen



ABOUT CLIENT II

Through its funding initiative "CLIENT II - International Partnerships for Sustainable Innovation", the Federal Ministry of Education and Research (BMBF) supports demand-oriented research cooperation with selected emerging and developing countries. The international collaboration projects develop solutions in the areas of climate, environment, resources and energy that contribute to overcoming specific challenges identified in the partner countries. Adopting innovative and sustainable methodologies, each CLIENT II project promotes the implementation of a selection of viable sustainable development goals (SDGs).



For further information, please go to:
<https://www.bmbf-client.de/>



The provision of infrastructure such as bridges and roads is fundamental to economic development in West Africa, as it is the world over. However, high temperatures, high humidity, the coastal climate along the main transport routes, and regular flooding pose serious threats to such assets. Their failure would have serious economic consequences in Ghana and its neighbouring countries. INFRACOST evaluates the structural condition of system-relevant infrastructure assets and develops maintenance concepts that can ensure their continued functional integrity.

INFRACOST is a joint project in which MC-Bauchemie works together with various project partners. While the Federal Institute for Materials Research and Testing (BAM) is investigating and evaluating the use of local raw materials together with the University of Ghana, MC-Bauchemie Ghana is developing and testing application-oriented decision-making aids and innovative building materials designed to also benefit the local Ghanaian value chains in the maintenance and repair of infrastructure assets. Also involved in this project is an array of other partners such as local universities, trade associations and governmental agencies. Now in its fourth year, the project is managed by Dr. Wolfram Schmidt of the BAM (see interview on adjacent page).

Local solutions to global problems

The focus is on developing concretes optimised for increased life expectancy for new build projects, together with structurally strengthening mortars for repair and refurbishment work. To make the respective technologies more sustainable, the INFRACOST project consortium is developing them primarily on the basis of locally available raw materials, including organic and mineral by-products from other processes. In Ghana, agricultural residues such as cassava peels and waste from cocoa production have a particularly important role to play in this respect.

Since knowledge and technology transfer are also essential elements of this project, INFRACOST promotes and provides university courses not just for students but also for industrial company and public authority personnel, as well as practical training for users and planners. Moreover, a handbook for advisers and political decision-makers has also been developed to provide key guidance and recommendations.

To cement and consolidate the process of knowledge transfer, the research results and technologies have been directly applied as part of a pilot repair campaign involving the Saglemi Bridge in cooperation with the Ghana Highway Authority. Looking forward, it is expected that the project will give a significant boost to improving Ghana's infrastructure.

“ GREEN BUILDING MATERIALS FROM WASTE

Interview with Dr.-Ing. Wolfram Schmidt



Dr. Wolfram Schmidt from the Department of Building Materials Technology of the BAM (see below) is widely experienced in international research cooperation. The building materials technologist is currently coordinating the INFRACOST project in Ghana funded by the Federal Ministry of Education and Research (BMBF). We talked to him about the opportunities and requirements for more ecologically compatible construction within the African market.

Africa is a growing continent with huge potential. Looking to the future, how – in your opinion – is the construction sector there likely to develop in the coming decades?

The best prospects for economic development in growing African cities derive from the ensuing enormous demand for building materials. So far only 20 per cent of the urban structures destined to be built by 2050 have actually been constructed. Conversely, that means that 80 per cent of the city buildings that the future holds are likely to be constructed over the next 30 years. Without concrete, that will not be possible. Even though it is considered unpopular, in the absence of economic alternatives it remains the most suitable building material for the African cities of the future. Compared to all other building materials, including steel, it has the lowest carbon footprint and energy input requirement. Timber is expensive, scarce and deforestation is causing dramatic environmental damage in many African countries. So concrete is the only building material on earth that can meet this enormous global demand driving construction.

How is this huge demand for concrete – and therefore for cement – as a building material going to be satisfied?

One option is through previously unused agricultural residues from the region. These contain mineral components that are suitable as binder substitutes, as well as organic constituents that can serve to improve robustness or as liquefying admixtures in the concrete. Such options could contribute to sustainability and the reduction of climate emissions in two ways: firstly by reducing cement consumption and secondly by making

better use of the cement used. The most likely resource for cement replacement here is ash from agricultural waste. This occurs in large quantities and is not currently being used for other technologies. When agricultural waste is burned at temperatures between 600 and 800 °C, the residual ash will often contain significant amounts of reactive silica and aluminium oxides, enabling it to replace up to 30 per cent or more of the Portland cement clinker used in concrete, a commodity that commands an appreciably higher price on the trading markets. Before the ash is produced, organic components can be extracted which improve concrete processability. Indeed, such low-cement concretes cannot be manufactured without them, as the ashes produced often exhibit a higher water demand and can in some cases significantly change the overall binder system. Superplasticisers and stabilisers are the key to success here, which means the expertise of the construction chemicals industry is also very much in demand.

Producing climate-friendly concretes does indeed appear to be a highly innovative and sustainable approach! Where do you see the obstacles to market implementation arising?

The biggest hurdle to the extensive utilisation of such green building materials lies in society's misconception that agricultural waste products are only suitable for low-end use.

So it is imperative that future decision-makers in rural areas be made aware of the opportunities and acquire a clear conception of the economic and social potential of agro-based building material markets. In addition to new sources of income,

these markets also help to strengthen regional agriculture, making it more secure and enhancing its independence. It is a win-win situation, with agricultural waste products combining with construction chemical admixtures to produce a climate-friendly concrete – to the benefit of both local populations and the construction industry at large.



ABOUT BAM

The Federal Institute for Materials Research and Testing (BAM) is a scientific and technical higher federal authority assigned to the Federal Ministry for Economic Affairs and Energy. It tests, researches and advises on the protection of people, the environment, materials and manufactures, while serving to maintain high health and safety standards in technology and chemistry covering Germany and its global markets. As such, it contributes to the further enhancement of Germany's culture of quality under the "Made in Germany" brand.



For further information,
please go to:
<https://www.bam.de/>



REHABILITATION OF A 100-YEAR-OLD COMBINED FLOW SEWER

The Neustädter interceptor in Dresden began life in 1906 as one of two underground intercept and transport lines carrying combined flow sewage. In its original state, it had a layer of mineral render measuring up to 25 mm thick applied to a substrate of compressed concrete. The render layer exhibited signs of significant wear and tear due to mechanical stress, with

sanding, cracks and numerous other flaws readily apparent. In certain locations, especially in the area of the spillway sills, coarse-grained ballast was visible as a result of material spalling. As the spillways and associated overflow structures had complex geometries, the client and planners followed the recommendation of MC-Bauchemie to implement

reprofiling and coating with the special mineral mortar ombran MHP-SP 3000. Characterised in particular by its optimised chemical resistance, the mortar was applied directly to the “healthy” tamped concrete over a total area of around 1,200 m² in a layer thickness of approx. 20 to 25 mm – a quick process that nevertheless produced excellent results.



For the full project report (German only), please go to: <https://bit.ly/3s2SuXM>



FRANKFURT-SINDLINGEN SEWAGE TREATMENT PLANT

REHAB WITH LONG-TERM PROTECTION

The return sludge channel of the biological wastewater treatment plant in Frankfurt-Sindlingen, built at the beginning of the 1960s, was rehabilitated in 2015 using MC product systems. Five years later, an expert audit and inspection confirmed the durability of the repairs and thus the performance of MC's surface protection solutions.

With a design capacity for a population equivalent (PE) of 470,000, the sewage treatment plant serves the westernmost districts of Frankfurt and the towns and villages of the neighbouring Taunus highlands. A return sludge channel of closed prestressed concrete construction built in 1984 was comprehensively rehabilitated in 2015 after 30 years of operation, in the wake of extensive concrete damage caused by biogenic sulphuric acid corrosion (BSAC).

The products applied were MC-RIM PROTECT, a fibre-reinforced and highly sulphate-resistant surface coating system, and MC-PowerPro HCR, a duroelastic coating system for chemically highly stressed surfaces in the wastewater sector. The

latter is characterised by very good resistance to organic acids, salt solutions and alkalis, as well as to biogenic sulphuric acid corrosion.



Coating confirmed to be in tip-top condition, even after five years of operation.

Still in top condition despite BSAC attack

An expert audit and inspection was carried out in the summer of 2020 in order to determine the quality of the coating and the condition of the constructional fabric after five years of continuous operation. Even in the extremely stressed areas, only a slight change in gloss and colour tone of the coating could be detected. The comprehensive appraisal report confirmed that the coating remains in very good condition despite the aggressive attack to which it is exposed. Repairs to the concrete infrastructure of sewage treatment plants are complex undertakings that can significantly affect regular operation. Consequently, ensuring the long-term protection of the rehabilitated components is essential both economically and ecologically. In this Frankfurt facility, as elsewhere, MC-RIM PROTECT and MC-PowerPro HCR have proved to be a powerful combination when it comes to the effective protection of key assets.



For the full project report (German only), please go to: <https://bit.ly/3Av8uES>



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CONSTRUCTION PROGRESS IN ALL WEATHERS

HYDROPOWER PLANT IN SERBIA

Recently completed on the River Lim in south-western Serbia lies a small hydroelectric power plant designed to cover the electricity needs of the town of Priboj and its environs. Construction of the associated dam required the full range of MC's expertise in concrete technology.



Work in progress – the hydropower plant in August 2019

Accounting for a share of about one third of electricity production, hydropower is already one of Serbia's most important energy sources. So far, this sector has been dominated by large plants generating in excess of 10 MW. However, in order to fully exploit the potential that exists, Serbia is moving more towards small hydropower plants as a solution for the medium to long term.

One such in Priboj, 250 kilometres southwest of the Serbian capital Belgrade, had been on the planning horizon for a decade. Although energy assessments and the building permits had already been issued back in 2012, it needed an additional environmental study commissioned by the Serbian state government – which asserted no negative impact on the environment – to dispel the doubts of local residents. Construction of the 46-metre-high dam of the small hydro-power plant finally began in September 2018. The plant's output, with a flow rate of around 165 m³ of water per second, amounts to 7.9 MW per year. The facility was completed in July 2021. Hidro Tan d.o.o. was commissioned to build the structure, with the concrete being supplied by Beton komerc d.o.o. Both these Belgrade-based companies had already had positive experience

of MC's advice, products and customer service in other projects. Right from the start, therefore, MC's expertise in concrete technology was regarded as a known and reliable factor.

Robust concretes for summer and winter

The cement mix for the dam had to be formulated to ensure crack avoidance. Following extensive trials on the part of MC, C 25/30 and C 30/37 XF2 concretes were specified in the project planning. However, the real challenge lay in the weather conditions prevailing at the

location: Hot, dry summers are just as common in the region as harsh, frosty winters. It was essential to maintain consistent construction progress throughout the year. Hence, high-performance superplasticiser MC-PowerFlow 5695 based on the latest MC polymer technology, and Centrament Retard 370, a setting retardant particularly suitable for high fresh-concrete and ambient temperatures, were used in summer. And in winter, the contractor was able to rely on the likewise PCE-based superplasticiser MC-PowerFlow 3100 for high-flow concretes in combination with Centrament Frost, a chloride-free antifreeze concrete admixture for cold concrete placement.

By final completion in summer 2021, around 30,000 m³ of concrete had been successfully installed, with MC's concrete admixtures ensuring smooth project progress throughout the three-year construction period, summer and winter alike.



View inside the hydro-electric power plant.



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RENOVATION OF A MONESTARY COMPLEX IN MAJK

Timeless, natural beauty in traditional splendour



Truly a historic architectural gem: a view of the Camaldolese Hermitage monastery complex in its as-restored state

Located in Majk, Hungary, the Camaldolese Hermitage, a Benedictine monastery complex, was originally built in the 18th century. Thanks to a state programme promoting the renovation of Hungarian heritage assets, the historically important building ensemble is now being returned to its former splendour. And the moisture-regulating render Exzellent STP from MC-Bauchemie played a major role in its rehabilitation.

The town of Majk lies some 75 km from the Hungarian capital of Budapest. And it was there that the Benedictine Camaldolese Hermitage was built in the 18th century as a sprawling monastery complex. It comprises a prodigy mansion serving as a guest house and the prior's residence – also known as the Esterházy hunting lodge – as well as 17 simple hermit's cottages or "retreats" surrounding a Baroque church tower. Since the 1980s, the complex has served as a much visited tourist attraction.

Faithful restoration

During the primary renovation work, special attention had to be paid to heritage preservation. It was important to ensure that both the building structures and the parts accessible to the public were faithfully, safely and permanently restored. Special challenges also arose due to the high capillary moisture and heavy salt load contained within the masonry.

Modern technologies such as retrofitting a damp-proof course or similar horizontal barrier had to be ruled out from the outset due to the damage that the historic building structure would suffer. So László Bors and Erika Luthár, MC specialists in the renovation of historic buildings, suggested the use

of the Exzellent STP render system, a product line especially developed for the repair of masonry that has been severely damaged by moisture and salts.

Excellent recovery of salt-laden and damp masonry

As a salt transport and moisture-regulating plaster, Exzellent STP enables masonry exposed to moisture and salts to permanently dry out through the progression of a natural process. The render system offers huge advantages in this respect due to its unique network of micro- and macro-pores. The moisture, together with the salts dissolved in it, is reliably and continuously transported out of the masonry to the render surface without destroying the coating structure. Further, the natural mineral render both prevents the formation of mould and ensures a pleasant interior climate. Since, for heritage preservation reasons, construction materials had to be used that resembled those of the original historic buildings – and in the 18th century there were no cementitious mortars or renders – the specialists at MC recommended application of cement-free Exzellent STP historic. This is based on NHL (natural hydraulic lime) and Roman lime and offers the perfect solution for the restoration of listed monuments.



Inside, the monastery complex exudes its baroque beauty.

The final phase of the renovation of the Camaldolese Hermitage began in March 2018 and is expected to be completed by the end of 2021. Thereafter, visitors will once again be able to admire the historical and natural beauty of the former monastery in all its authenticity.



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MAJOR PROJECT IN GHANA

CONSTRUCTION OF THE POKUASE INTERCHANGE



As a section of the Central Corridor infrastructure project, the Pokuase interchange in Ghana is of considerable economic importance for the West African country on the Gulf of Guinea. And MC-Bauchemie Ghana was able to make a considerable contribution to the construction of the spectacular road junction with its four levels.

Pokuase is a vibrant suburb of Ghana's capital Accra. It is known for a mix of lively shops, bars, restaurants and a market, and is also popular with tourists. On the periphery of the district, the Pokuase interchange has become a central hub for several major highways that connect Greater Accra with the emerging regions in the northwest of the country and elsewhere. Underneath the interchange run eight lanes as well as the Mass Rapid Transit local rail transport system and other railways. The construction project cost about 100 million dollars and was financed by the African Development Bank and the government of Ghana. The state infrastructure agency Urban Roads was advised by Associated Consultants Ltd. as planners, and Zhongmei Engineering Company Ltd. of Nanchang, China,

was contracted for the construction work, the execution of which ran from May 2018 to July 2021. The cantilever construction method was used for the first time ever in Ghana for Level 4 of the interchange.

We are grateful for the professional support provided by MC-Bauchemie Ghana throughout the project.

*Kwabena Bempong,
Vice President of Associated Consultants Ltd.*

MC Ghana supplies extensive product range

The concrete admixtures required for the concretes of this large-scale construction – used in the bridge piers, ramps, planks, carriageways, etc. – were supplied by MC Ghana. Of key importance in the order award were the modern concrete laboratory of MC in Accra, MC's concrete technology support and, last but not least, the local availability of the required building materials, which are all extensively produced in Accra. For example, various concrete admixtures were used in the construction of the motorway interchange, including the superplasticisers MC-PowerFlow 2695 and Muraplast FK 39, the setting retarder Centrament Retard 370 and the accelerator Centrament Rapid 600.

MC superplasticisers deliver top performance

Above all, MC-PowerFlow 2695 impressed in every respect, with all expectations fulfilled. The high-performance superplasticiser based on the latest MC polymer technology produces stable, segregation-free concretes over the entire consistency range. It acts quickly and ensures long-lasting liquefaction and high early strengths as well as high-quality concrete surfaces and high final strength values. The grouting mortar Emcecrete HP as well as the PCC concrete replacement Nafu-fill KM 250 were also used, as were the products of the Mycoflex system for joint sealing. The interchange was opened in the summer of 2021 and has since helped to reduce congestion in the increasingly prosperous region while enhancing road safety and general mobility in Ghana.

Project manager expresses gratitude to MC

"The Pokuase Interchange is an extremely important transport infrastructure and a masterpiece of civil engineering in Ghana," says Kwabena G. Bempong, Vice President (Business Development) at Associated Consultants Ltd. and Resident Engineer for the project, adding: "We are grateful for the professional support provided by MC-Bauchemie Ghana throughout the project."



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PORTRAIT



MEINRAD SUPPIGER – A SWISS SUCCESS STORY

Meinrad Suppiger (65) worked for a long time in field sales for Switzerland, including as area sales manager for western Switzerland and most recently as target manager with a focus on power plant construction and tunnel applications. He played a key role in building up MC Switzerland and, after some 30 years with MC, took his well-deserved retirement in spring 2021.

Meinrad Suppiger initially trained as a machine technician and, after completing one year's military service, started working for a power plant constructor. There he spent six years installing steam turbines abroad, working in South Africa, the USA, Spain and South Korea. After two field sales jobs and a part-time higher diploma in commercial travel and salesmanship, the keen runner and cyclist joined MC Switzerland as a field sales representative on 1 January 1989. "Then it was straight to MC's HQ in Bottrop on 3 or 4 January 1989 for – you can hardly believe it today – six weeks of training! It was both very intensive and extensive, but I learned a lot and benefited greatly from it," says Suppiger, looking back with a note of satisfaction. The training

formed an excellent basis for his future pioneering work on behalf of MC in Switzerland, in the course of which he earned a good reputation for both himself and MC.

Groundbreaking progress for MC Switzerland

After ten successful years at MC, he spent a short "intermission" at a firm of applicators. From there, he was brought back to the MC team and worked in field sales for central Switzerland from 2002 to 2009, moving on to area sales manager for central and western Switzerland from 2010. In his last role he was responsible for MC Switzerland's power plant and tunnel construction business areas. This sporty Swiss actually entered into retirement in autumn 2020 with

the aim of embarking on a long touring holiday. But the coronavirus pandemic meant he had to tear up those plans, at which point he decided to simply add a few more months to his long career with MC. Daniel Stirnimann, Managing Director of MC Switzerland, is full of praise for this exceptional salesman and company representative: "Meinrad Suppiger has always been a creative, can-do kind of guy. He was constantly able to spot the potential of a situation, applying his own ideas and imagination and thinking outside the box – as a result of which he was very influential in shaping the development of MC Switzerland."

So we say thank you, Meinrad Suppiger, and all the best for the future!

INTRODUCING: SYBILLE ZOLLER

FROM BACK OFFICE SALES TO STAGE PERFORMER

Sybille Zoller (56) started work as a commercial clerk at MC's Leipzig Service Centre at the end of 1992. She is the heart and soul of the Service Centre's office staff and plays an important role both as a facilitator within the overall team and in liaison with customers. In her free time she pursues her passion for music, performing on stage as singer Cybil Caprice. For over a year now she has been learning Greek so that she can communicate more effectively when in Crete, a regular holiday destination for her.



Sybille and Cybil – all the best and continued success!

INTERNATIONAL LINKEDIN PAGE

MC-Bauchemie has launched an international LinkedIn page that serves as an umbrella site to showcase relevant content from all other MC country pages – the "global" face of MC, so to speak. Please do follow us and give us a like! 😊



Click here to follow:
<https://bit.ly/3rInPPc>



PERSONNEL NEWS



DR.-ING. IURIE CUROSU (34) assumed the role of Product Management Team Leader within Concrete Repair and Surface Protection at MC-Bauchemie as of 1 July 2021. Born in Moldova, he completed his Bachelor's degree in civil and construction engineering at the Technical University of Civil Engineering (UTCB) in Bucharest (Romania) and subsequently obtained his Master's degree in 2013 – majoring in concrete technology – at the Faculty of Building Materials at Dresden University of Science and Technology (TU Dresden). He received his doctorate from the same faculty in 2017, with his thesis again based on research in the field of concrete technology. He then supervised a large interdisciplinary DFG (German Science Foundation) research project there until June 2021.

NADIJA ZHURAVLOVA (34) joined MC-Bauchemie as Business Development Manager for Eastern Europe and the Caucasus on 15 March 2021. She started her professional career at the Austrian Embassy in Kiev, after which she worked for six years in the sales department of an international manufacturer of GRP tube and pipe. Previously, the Ukrainian completed a Master's degree in technical translation in German and English in Ukraine. In 2017, she enrolled at a German university to study International Management, graduating with a Bachelor's degree in 2020.



16 NEW APPRENTICES AT MC

On 2 August 2021 MC-Bauchemie officially welcomed 16 new apprentices to the Training Centre in Müllerstrasse in Bottrop for their first day with the company. They will be pursuing a broad range of training opportunities in various commercial and industrial professions across the MC organisation.

The new apprentices at MC-Bauchemie posing for the traditional group picture in front of the MC-Bauchemie Training Centre in Bottrop (from left to right): Yakub Mendil (chemical production technician), David Lazarevic (warehousing logistics technician), Jonathan Marcel Jakobs (industrial management with economics studies), Meiko Tünte (freight forwarding and logistics services clerk), Fatih Gören (chemical technician), Katharina Moor-Herber (industrial clerk), Niklas Müller (paint laboratory technician), Pierre Samland (chemical production technician), Ali Aydin (industrial fitter / maintenance), Nina Overkämping (chemical laboratory technician), Dennis Böhmer (industrial fitter / maintenance), Julia Sophia Jansen (industrial clerk), Lisa Hempelmann (building materials tester), Noah Schröck (plant electronics technician), Lukas Scheffczyk (industrial clerk) und Kaan Kasıkcı (chemical production technician).



NEW APPRENTICESHIPS WEBPAGE

July this year saw MC launch a new online resource for apprentices. It can be accessed via the Careers section on the MC website and provides comprehensive information about the apprenticeships at MC as well as the associated benefits for apprentices. Visitors to the webpage will also be offered brief portraits of former apprentices plus a Q&A section dealing with specific questions relating to training at MC.



The webpage can be found here (German only):
<https://bit.ly/2VdiWC6>



Fast concrete.
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ESPECIALLY IN WINTER!



MC-FastKick Hardening Accelerator

While reducing CO₂ and improving the economics of concrete production, advanced concrete formulations with clinker-optimised binders can nevertheless have a negative impact on the application and curing properties of the concrete. MC-FastKick effectively neutralises these disadvantages. This hardening accelerator is able to both compensate for any deficit in early strength development and improve the workability of the concrete through additional consistency enhancement. It's your route to optimising concrete production, even at low temperatures.

MC-FastKick: good for your concrete and for our climate.

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