

Embracing a low-carbon and sustainable future

In recent years Cementir has been committed to pursuing a programme inspired by the circular economy, which envisages a set of initiatives to reduce the environmental impact of its operations and develop low-carbon solutions. A key part in this programme is played by FUTURECEM™, limestone calcined clay technology.

■ by *Michele Di Marino, Stefano Zampaletta, Jesper Sand Damtoft, Alessandro Perrone and Brian Dürr, Cementir Group, Italy, Denmark and Belgium*

Cementir has decided to take disruptive action to fight climate change by defining a 10-year roadmap to maximise the deployment of existing technologies and laying the groundwork for the breakthrough innovations that will lead to the production of ‘net-zero emissions’ cement. By 2030, the company aims to reduce its Scope 1 emissions to less than 500kg CO₂/t of grey cement produced (equivalent to a 30 per cent reduction of CO₂ emissions/t of cement by 2030 versus 1990).

Pivotal role for FUTURECEM™

FUTURECEM™ is an innovative, validated and patented technology that allows more than 35 per cent of clinker substitution in cement with limestone and calcined clay. Leveraging on their synergy, this combination of materials in FUTURECEM has resulted in a more sustainable and well-performing cement with up to 30 per cent lower carbon footprint compared to ordinary Portland cement. And the low-carbon benefits of FUTURECEM are achieved without compromising strength and quality.

Its technology is fully acknowledged as a solution for clinker ratio reduction in the roadmap for “Low Carbon Transition in the Cement Industry” by the International Energy Agency – 2018 and as “low-clinker cements” in the “Cementing the European Green Deal” – 2020. Moreover, it is formally recognised in the EN 197-5 European standard for even further clinker substitution with II/C-M cements (up to 50 per cent).

After full-scale testing in infrastructure and buildings in the Danish project Green Concrete II since January 2021, FUTURECEM

is on the market in Denmark, placing Cementir Group at the forefront as the market leader in sustainable and low-carbon cement by leveraging on limestone calcined clay technology.

Ongoing market roll-out in Europe: plan and outcomes

The product has been well received by customers and the market in general. There is an increasing interest in reducing CO₂ along the construction value chain: 30 per cent on cement and thus 25 per cent on concrete, which results in a significant reduction from a single building material in the total CO₂. This makes FUTURECEM a valuable solution towards sustainability and supports the national initiatives and new requirements on max CO₂ embodied in new buildings from 2023 in Denmark. Additionally, FUTURECEM is a key driver to achieve the targets of a 50 per cent CO₂ footprint reduction in concrete by 2030.

“Our customers are working to get the cement implemented in their recipes and document the properties according to their quality plan. According to them, our RAPID cement (CEM I 52.5N) can be easily replaced by FUTURECEM achieving the same performance. They are very positive on concrete pumpability and robustness. At the same time, the finishing is really nice and surfaces are absolutely perfect,” says Brian Dürr, sales director at Aalborg Portland.

Ready-mix concrete customers employ FUTURECEM in concrete production to benefit from its consistency in quality and its ability to be pumped easily where required



With a conservative construction sector, new and innovative products such as FUTURECEM have to be considered in the early design stage to ensure a high-quality construction and compliance with legal standards. This could result into a relatively slower process to convert already approved and ongoing projects. However, it is highly gratifying that FUTURECEM is increasingly becoming the main choice, with an expected exponential development by the end of the year when the product will be embedded in the “daily production”.

To date FUTURECEM has been primarily focussed on the ready-mixed concrete (RMC) segment. Customers within this segment exploit the specific FUTURECEM properties to make concrete more stable against variations in consistency and easier to pump, which is usually a challenge with the rather cement-poor concrete used in Denmark.

Unicon, a group subsidiary in the RMC business, has fully embraced FUTURECEM cement, embedding it into a complete green product programme, under the



Following the launch in Denmark, FUTURECEM's roll-out is continuing apace in Europe

name of “UniGreen” to promote the use of CO₂-reduced RMC in all buildings across the country. All production will be converted into FUTURECEM.

Unicon has noted that the interest in reduced CO₂eq environmental impact is so far greater among authorities and developers than at contractors' level.

Along with the RMC sector, several Danish concrete precast producers are implementing FUTURECEM in their production through a complete on-site testing programme. The main difference perceived is the light-brown colour of the concrete, which is considered as a seal of quality and a visible proof for builders to show their sustainable building.

One of the first projects with FUTURECEM is the ambitious sustainable building UN17 Village in Ørestad, Copenhagen, with more than 500 apartments. When completed in 2024, it will be known as the world's first housing project that integrates all 17 UN world goals in the same building.

The decision to use FUTURECEM was obvious to the builder, NREP. The first concrete structure, a big retaining wall, has already been built with FUTURECEM, which, according to the plan, will also be used on a large scale in the construction itself, giving a 25 per cent reduction in the CO₂ footprint on the type of concrete normally used in such projects.

Following the launch in Denmark, FUTURECEM's roll-out is ongoing in Europe. CCB, the Cementir Group subsidiary in Belgium, is targeting to commercialise FUTURECEM in France from 2022 and in Benelux by 2023. Extra effort is required to address the complexity of different markets, habits and regulations that could limit innovative and low-carbon cements

with additional local certifications.

In line with the Cementir Group's customer-centric approach, the commercial team, in collaboration with the R&D centre, is developing technical workshops and cooperation with key customers to shape a customised value proposition according to the identified application segments such as RMC, precast, dry mix

and general contractors. Customer support will continue with a close collaboration in the implementation phase in their production process.

Along with external customers, Cementir Group is promoting down the value chain an eco-sustainable RMC offer through C-Green within all its plants in Belgium and France, by leveraging circularity (use of recycled aggregates) and a low CO₂ emission footprint (FUTURECEM limestone – calcined clay technology and other blended cements).

Further developments

Development efforts do not stop with the launch of FUTURECEM in Europe. As the global market leader in white cement, Cementir Group has invested in further developments and commercialisation applying limestone-calcined clay technology. Currently, Cementir Group is incorporating sustainable technology to more cement types in its product range: this includes white cement and white cement-based solutions with FUTURECEM.

Within its innovation pipeline, under InWhite®, Cementir Group launched UHPC solutions in late 2019. The new technology has therefore already powered the white cement based innovative pre-mixes, such as Aalborg Extreme® and Aalborg Excel®. New solutions are on the way for 3D printing (Aalborg Explore®) and for infrastructure and flooring rehabilitation (Aalborg ReCover) as well as versatile binders for different applications.

“FUTURECEM is a giant step on the way towards more sustainable cement production. This is immensely important not only for Cementir Group but also as key contribution to the green transition for the

concrete, construction and cement-based industries in general.

This was a clear outcome from a survey, performed by Cementir Group in 2020, to explore and figure out the status of the ‘green transition’ in northern and western Europe, and how cement players would support this transition,” comments Chief Sales, Marketing and Commercial Development Officer at Cementir Holding NV, Michele Di Marino.

During recent months there has been a growing interest, ranging from co-development to licensing, in FUTURECEM as a limestone-calcined clay technology from key users in different application segments and other industry players that need a low-carbon solution to achieve their CO₂ emission reduction targets.

Supporting research

Innovation continues to be key for Cementir Group with further plans for the continuous development of FUTURECEM technology by leveraging its Aalborg-based R&D centre.

In collaboration with the Danish Technological Institute, the company is managing CALLISTE – Calcined Clay-Limestone Technology Extension – applied research initiative, built on FUTURECEM technology and co-funded by the Innovation Fund Denmark.

The main goal of CALLISTE is to reach a CO₂ reduction as high as 50 per cent compared with conventional Portland cement by the end of 2024.

The consortium behind CALLISTE comprises producers of all main types of concrete: ready-mix concrete, precast concrete elements and dry-cast concrete products. The inclusion of the Danish Road Directorate and Femern A/S in the consortium will enable demonstration of the use of the new cement in infrastructure projects. In addition, participation by building owners will offer opportunity for full-scale demonstrations.

At international level, within FUTURECEM development and dissemination, Cementir Group has been very active in the development of Innovandi, a large industry consortium comprised of 30 companies from across the cement and concrete industry, through representation in the steering committee as industrial member.

Furthermore, in 2021 experts from the group will be mentors in the Innovandi Open Challenge, a global programme to bring together tech start-ups and Innovandi members. ■



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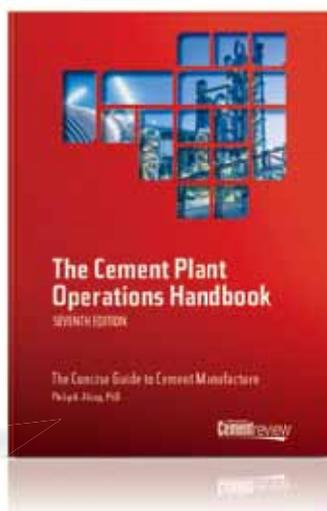
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