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Dear readers,

Welcome to the February 2021 issue of *Global Cement Magazine* - the world's most widely-read cement magazine. The US now has its 46th President, Joe Biden. He has a *lot* to get on with. Alongside the clear and present danger of the Covid-19 pandemic, Biden has highlighted three other crises facing the US: the economic downturn, racial injustice and climate change. The US rejoined the Paris Climate Accord and cancelled the ban on entry to the country from certain Islamic countries on day one of the new Presidency. Biden will also reportedly cancel the controversial Keystone Pipeline project, while new policies include an eight-year route to citizenship for law-abiding undocumented migrants, ending the considerably harsher deportation-led approach of Donald Trump.

If this all sounds a bit familiar, it is because Mr Trump also spent a lot of his time reversing the policies of his own predecessor, Barack Obama. This trend of undoing that which came before highlights the increasingly entrenched division in US politics, where opposing sides increasingly view each other not as neighbours that disagree, but as an enemy that must be silenced. So, while the rest of the world may welcome Mr Biden's pivot to less combative policies, it will take more than Executive Orders to sew the frayed fabric of America back together. Biden's ability to bring people together may well define his legacy.

The spirit of working together weaves its way through this issue too, with in-depth interviews with both the Global Cement & Concrete Association (Page 12) and the World Cement Association (Page 16). It is, of course, no coincidence that these two bodies sprang up within a year of each other, as cement producers increasingly unite in their discussions with policy makers, the public, researchers and other industries. Both interviews highlight that cement and concrete must not only work together towards greater sustainability, but that they must also engage with sectors like energy and steel, environmental start-ups and others to look for solutions beyond the 'silo' of our industry. In Europe, for example, many sectors are challenged by rising CO₂ emission costs under the Emissions Trading Scheme (ETS), which now seems to have settled at above Euro30/t. Only a united front across many industries can take on the sustainability challenges we face.

Peter Edwards
Editor

Enjoy the issue!



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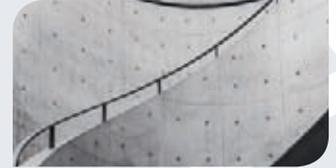
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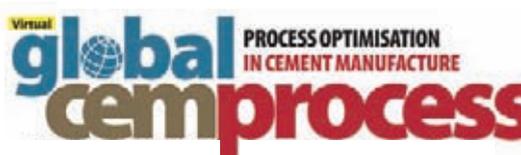
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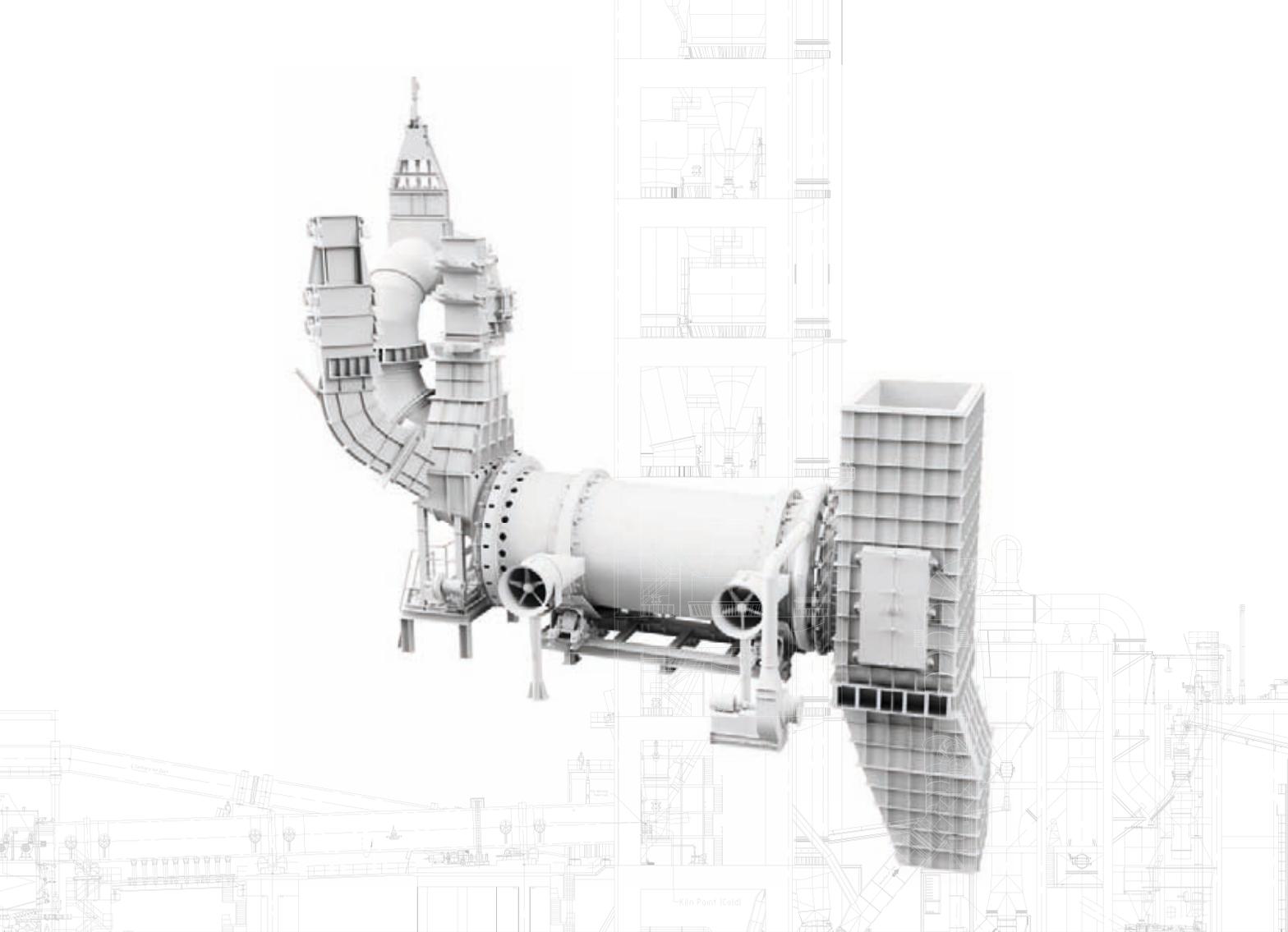
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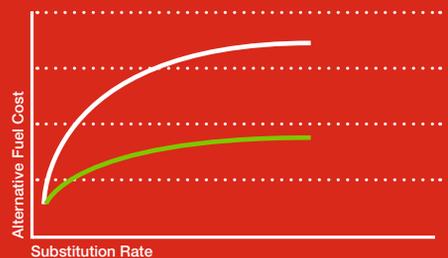
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Interview by Peter Edwards, Global Cement Magazine

In discussion: Dinah McLeod, GCCA



The Global Cement & Concrete Association (GCCA), founded in early 2018, released its 2050 Climate Ambition in September 2020. The ambition statement outlines the aims of the industry to transition to a low-carbon future and produce CO₂-neutral concrete by 2050. It represents the first time that the industry has come together to jointly state such a bold and wide-ranging set of sustainability targets. Its CEO Dinah McLeod recently took time out of her busy schedule to talk to *Global Cement*.

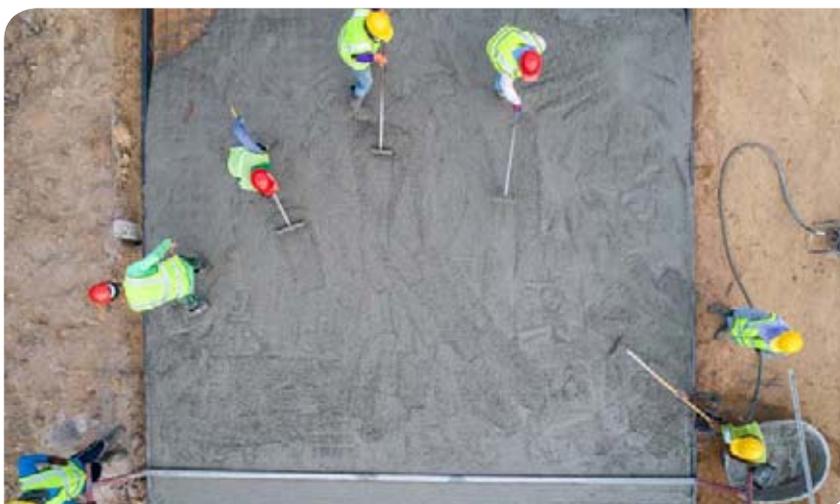
Above: Dinah McLeod has been CEO of the Global Cement & Concrete Association (GCCA) since July 2020. She is a social and environmental sustainability professional with over 20 years' experience in both the public and private sectors, working with companies such as Novartis, Unilever, BT, IKEA, Allianz and Mars. As CEO, she leads the GCCA's efforts to drive sustainable practices across the industry and to position cement and concrete as key contributors to solving today's global challenges.

Global Cement (GC): Please summarise the key points of the GCCA's 2050 Climate Ambition?

Dinah McLeod (DM): The GCCA represents 40% of the world's cement producers, all of which want to highlight the fact that concrete is the primary sustainable material for our built environment, both for today and tomorrow. As GCCA CEO, a major part of my job is to ensure that the organisation itself is seen as the industry standard for sustainability. This means that, when a cement producer joins the GCCA, it is publicly committing to sustainability in a very tangible way.

The GCCA's team collaborates very closely with the experts at our member companies to develop approaches and guidelines, which, in September 2020, led to the publication of our 2050 Climate Ambition. This sets out the important aspiration that our members will make a significant contribution to a net zero world by producing carbon neutral concrete by 2050, the first time that the industry has come together to commit to such a bold target and aligning to global climate targets.

Below: The GCCA's 2050 Climate Ambition seeks to facilitate CO₂-neutral concrete by 2050.



I only joined the GCCA in July 2020 and I find it really exciting to be leading an association that brings together such forward-thinking companies.

GC: How does the Climate Ambition rank among the GCCA's achievements to date?

DM: The publication of the Climate Ambition is an extremely important step in the development of the GCCA. It sets our direction. We are now working full tilt to produce a full Roadmap that will plot the course towards CO₂-neutrality. We are aiming to publish this at the end of 2021.

Some of our other major achievements include the establishment of Innovandi, our research network that brings together the industry, academics and technology providers to collaborate on cement and concrete sustainability. It has really taken off like a rocket and now has 71 partners. It offers the opportunity for meaningful insights and results for all parties.

Indeed the GCCA is now starting to bring real value to its members across many aspects of their business aside from sustainability. Producers from Asia speak to those in Africa, Europe, the Americas, the Middle East, everywhere within the context of our broad work programme. It's fantastic to provide that platform and witness the effective interaction and collaboration.

We should also note that the GCCA has gained a strong international reputation in three short years since it was established. We have regular interactions with groups at the UN, the World Economic Forum and with policy-makers from around the world.

GC: Is the GCCA predominantly focused on cement or concrete?

DM: Our members are clinker producers and we act on their behalf. However, our

focus extends across the entire life of the product, from the quarry at the cement plant, to concrete production, and to the eventual use and reuse of the end structure. From a sustainability standpoint, I liken it to an electric vehicle. There's no point judging its sustainability credentials as it leaves the factory. You have to consider the whole life-cycle of the product and how it performs across its whole life - concrete has amazing sustainability credentials.

GC: What are the key points of the 2050 Climate Ambition?

DM: When looking at the document, which I recommend your readers do, it is important to remember that the Climate Ambition is underpinned by a very detailed set of technical assumptions. I would say that strategically the first point is that concrete is the vital building material that has shaped our modern world. It is also the vital sustainable building material of tomorrow's world and will help build sustainable communities and provide resilience against the worst effects of climate change. It is absolutely vital, for example, to the conversion to renewable power generation, be it in a hydroelectric dam or the foundations for an offshore wind turbine.

Secondly, the document highlights that cement and concrete are hard-to-abate industries, albeit ones that are now much more sustainable than 30 years ago. We recognise that the industry needs to do more, so the document commits us to produce CO₂-neutral concrete by 2050.

Thirdly, the Climate Ambition does not shy away from the fact that achieving this will be a significant challenge. It will take all of the sector's collective research, innovation and investment coupled to contributions from other industries and, crucially, policymakers, to help ensure we hit the target. We are totally committed to it, though. There is no alternative.

GC: The document highlights that the GCCA will foster developments in benchmarking, innovation, best practice, knowledge-sharing and CO₂ measurement. How will it do this in practice?

DM: I'd like to emphasise, firstly, that each of those five areas is equally important. It is our members that will conduct their own research into these areas in collaboration with each other, where possible, and with those outside of the sector. The GCCA's role is to coordinate the efforts into mutually-beneficial directions. We have regular contact with around 200 partners and experts in the industry and draw on the depth and breadth they offer to help deliver our work programme and develop our policies and guidelines for the sector.



GC: How much of the route to a CO₂-neutral concrete industry relies on novel technologies, for example CO₂ capture?

DM: There are three main technical areas that we need to work within to get to this target, and CO₂ capture is going to be vital. However, the biggest challenge I see with this area is not technical feasibility, but ensuring policy can encourage and keep up with the development of the technology. There needs to be direction from governments and investment towards CO₂ capture. Whilst this is happening and we have great live projects and announcements from around the world, it is fair to say that we are not yet where we need to be.

Also vital will be lowering the CO₂ in the clinker production, by way of established technologies such as alternative fuels, waste heat recovery and enhanced automation. There are also exciting developments in electrified and solar-powered kiln technologies.

Once we have low-CO₂ clinker, we should also aim to reduce its use in the cement product by use of supplementary cementitious materials (SCMs). Many will be aware of research into ternary blends and other ultra-low clinker formulations.

From there, it is also crucial to look to reduce cement quantities in concrete while maintaining strength and the required performance benefits. Then, in an ideal world, the structures built using the concrete stand the test of time and, as required, are repurposed throughout their lifespans. Ultimately, we need to get society as a whole to look again at what happens when a building reaches the end of its life, to limit demolishing and, where necessary, ensure large parts are re-used. Where that's not possible, we must ensure that the concrete is recycled. We also need to look at how to delay the point where the structure becomes unviable as long

Above: The GCCA's 2050 Climate Ambition does not shy away from the fact that achieving a CO₂-neutral cement and concrete sector will be a significant challenge.



This Page: The cement sector needs to work with the steel (above) and power generation (centre) sectors to fully account for the CO₂ emissions of by-product SCMs, as well as producers of alternative fuels (below).



as possible so that concrete buildings last hundreds of years rather than being taken down after a few decades. Changing our current mindset on this will be a major challenge.

GC: Does the quest to extend the lifespan of buildings ultimately mean we will need less cement and concrete in the future?

DM: I would say this is possible, but you have to remember that we are taking these actions against a backdrop of continued urbanisation and population growth, especially in some developing regions where there is still much to be done towards providing essential infrastructure and attaining an enhanced quality

of life. This means that even if concrete use is reduced in developed markets, we may still see a rise in demand for materials across the whole world. It would be great to imagine that the world will one day be 'fully developed' but there will still be significant need for maintenance and reconstruction, for example following natural disasters. Ultimately if we are producing CO₂-neutral concrete we will be able to support the requirements of the world without the CO₂ emissions.

GC: You referred to the need for direction from policymakers earlier. What would the GCCA most like to see to help with its CO₂-neutral aims?

DM: First of all, there are places around the world that have no policies for the low-CO₂ transition, so the best way that such governments can help in the first instance is a change in mindset. We have 15 policy areas that we would like to see addressed worldwide, but let me outline three of the priority policy areas that we would like to see.

The first, like I mentioned above, is CO₂ capture, use and storage. We need investment and policies that accelerate research, roll-out of projects and on the infrastructure and storage side where we need governments to really support, as well as incentivising lower-CO₂ cement production.

We also need sound waste processing policies so that appropriate materials can be diverted from landfill and utilised in cement kilns. It is tempting to say that 'traditional levers' like this have been pushed to their limits, but in many world regions even alternative fuels remain in their infancy. For this reason, the GCCA is concentrating considerable advocacy efforts in regions with underdeveloped waste management systems.

Finally, and perhaps most importantly, we have to effectively communicate my message from earlier, that concrete is the sustainable material of the future. At the moment everyone is talking about 'building back better' after the Covid-19 pandemic. Without concrete, I would argue that there can be almost no building back at all. There will be entire new cities in the future, there will be wind turbines, dams, sea defences built, even roads, all built with CO₂-neutral concrete.

GC: What role does automation have to play in the transition to a CO₂-neutral concrete sector?

DM: There's no question that automation has a huge role to play in helping our members improve their process control, condition monitoring and logistics. These are areas in which they compete strongly with each other to improve their margins.

However, regarding the transition to a CO₂-neutral concrete industry, I would say that automation is possibly going to be a less significant lever than others. For our sector, the major benefits of artificial intelligence are more likely to come in building design applications. This will further optimise the mass of concrete used and help to bring out its thermal mass and recarbonation benefits.

GC: Will alternative cement chemistries have a role to play in the transition to a CO₂-neutral concrete industry?

DM: There has been significant research into other ways to produce binders, but I



think it's possible that they will primarily remain an academic pursuit. The use of calcium carbonates will remain central to our industry in the future because they are abundant, accessible and affordable in most parts of the world. Also, the work to optimise the sustainability of the existing process is well underway, through the use of alternative fuels, SCMs, and so on, but new chemistries around Portland clinker are being developed, for sure.

GC: How will the GCCA work with other industries to resolve existing CO₂ accounting issues, for example in areas surrounding SCMs like slag?

DM: It is a complex issue. The emissions do need to be accounted for in the right place. We cannot continue with a system that only looks at one part of the industrial puzzle, be it cement, steel or anything else. A whole-life approach is needed.

GC: Do you sense that the other industries are at a similar point as the GCCA in terms of resource efficiency and the low-CO₂ transition?

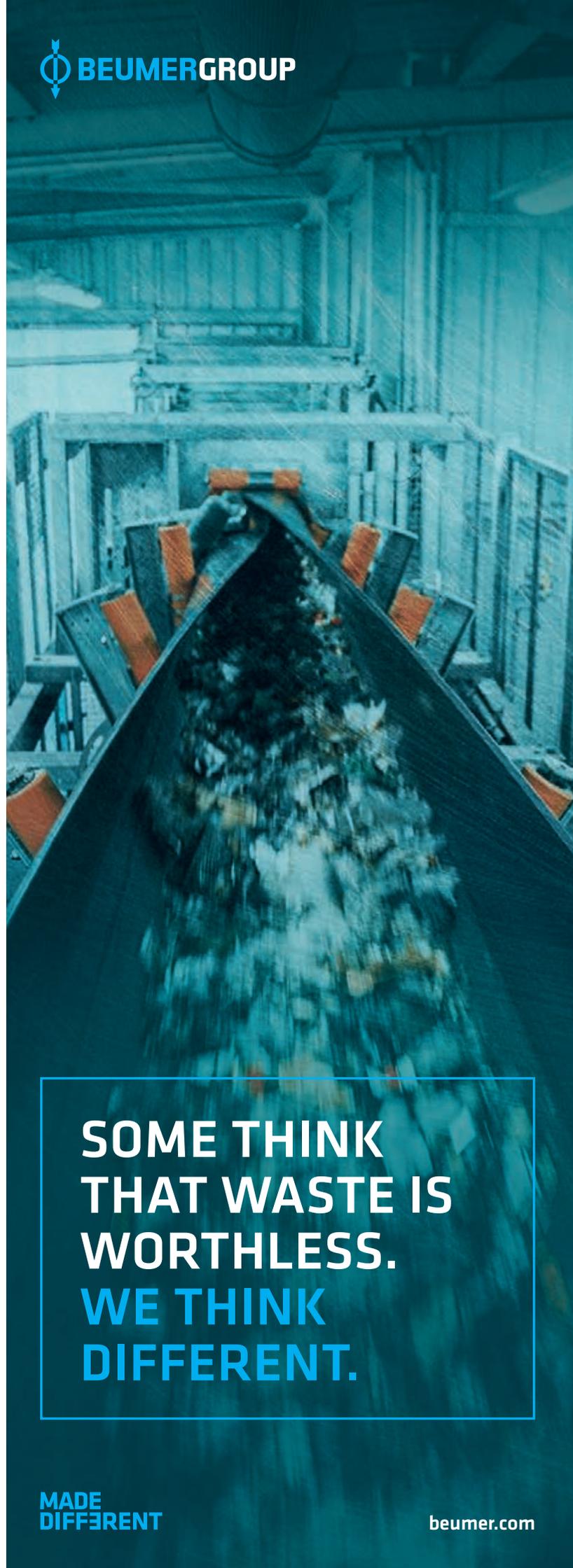
DM: We are ready to work with other sectors on a range of technical and legislative areas and certainly feel that collaboration on these topics is the way forward. We need to work alongside other industries that share our interest in the rapid development of CO₂ capture and storage / utilisation, for example. We are starting to have a number of interesting discussions right now, including as one of the industry leads of the World Economic Forum's Mission Possible Platform, which looks at routes to CO₂-neutrality across seven sectors.

GC: Do you see the GCCA working towards a CO₂-negative concrete industry in the long term?

DM: Before I answer, I would like to reiterate just how significant our members' existing commitment to CO₂-neutrality truly is. It is monumental for the sector and speaks to its long-term outlook on the industry. If everything works from a technical standpoint, let's say we do indeed capture, utilise or store all our CO₂ emissions, it could indeed be that we are able to deliver a CO₂-negative industry, but that would be in the distant future.

GC: Dinah McLeod, thank you for your insights.

DM: You are very welcome indeed. It has been great to speak with your expert readers! 



**SOME THINK
THAT WASTE IS
WORTHLESS.
WE THINK
DIFFERENT.**

Interview by Peter Edwards, Global Cement Magazine

In discussion: Decarb Connect and WCA

Effective and timely collaboration regarding decarbonation technologies will be key to minimising the effects of climate change, no more so than in hard-to-abate sectors like cement production. It is with this aim that the World Cement Association and Decarb Connect began a new partnership in 2020. *Global Cement* recently spoke to both parties about the journey so far and what cement producers can learn from other sectors.

Global Cement (GC): Please could you introduce Decarb Connect and how it operates?

Alex Cameron, Founder, Decarb Connect (AC): Decarb Connect was founded in early 2020 to facilitate discussion and collaboration around decarbonisation in hard-to-abate industries like cement, steel, ceramics, glass and power. From my background in conference production and network development, I could see that there was an unmet need to connect disparate sectors and share best practice.

What hard-to-abate sectors have historically been less adept at is looking over their 'silo wall' to consider approaches taken by other sectors. This is where Decarb Connect comes in. Our work involves making connections and providing information to participants in the hard-to-abate sectors which otherwise would not come into contact with each other. We do this by sharing best practice,

for example in our podcast and an online conference that we held in January 2021. We also have a private members group for industrial participants only, which is already proving to be a very fruitful ground for knowledge transfer and collaboration.

GC: How did the partnership between Decarb Connect and the WCA begin?

AC: I was aware that the WCA could be an important partner for Decarb Connect and was persistent in approaching Ian Riley over the first half of 2020. He was a valuable early point of contact within cement and he kindly answered many of my early stage questions regarding the sector. We are both glad that our early conversations have now developed into a partnership, including online events, his appearances on our podcast and the cement sector's valuable contribution to our networks.



Right: The global cement sector can learn a lot from other hard-to-abate industrial sectors, and teach them a thing or two as well. The plant shown is the Alesd plant in Romania. **Credit:** Cristian Carstoiu, entrant to the *Global Cement Photography Competition*.



Above: Ian Riley is the CEO of the World Cement Association (WCA), which was founded in 2016. Based in London, the WCA acts as a voice for cement sector producers and suppliers, provides them with practical assistance and seeks to accelerate decarbonisation within the sector. Riley has many years of experience in the cement sector, most recently as country manager for LafargeHolcim in China between 2008 and 2019.



Above: Alex Cameron is the Founder of Decarb Connect, a London-based consultancy that was founded in January 2020. It seeks to speed up the low-carbon transition in hard-to-abate process industries, including the cement sector. She has a background as a conference producer in the energy sector and, more recently, has leveraged her soft skills to develop networks and enable collaboration across a range of industries.

Ian Riley, CEO, WCA (IR): Cement and concrete are, and will remain, vital building materials for many decades to come. What we need to do is decarbonise their production, which is why we are collaborating with Decarb Connect and other partners. There has been some negative coverage in the UK press lately, which shows that the sector needs to explain both the need for concrete and what we are doing to reduce its environmental footprint to the general public more effectively. It is also important that researchers and suppliers know that cement represents an attractive opportunity for novel abatement technologies.

GC: What are the most interesting lessons in terms of decarbonisation that other hard-to-abate sectors can take from the cement sector?

AC: When I founded Decarb Connect, I found many who felt that they were the 'only one' working on decarbonisation in their field, with the perception that not much was going on. This was as recently as 12 months ago.

Fortunately, Decarb Connect has been in a position to correct this misconception. In many conversations, I have been able to draw on the many well-developed and diverse cement sector CO₂ abatement projects, many of which your readers will be familiar with. Indeed, the cement sector has been very proactive with regards to decarbonisation compared to other hard-to-abate sectors, which may surprise some industry participants.

Crucially, the examples from the cement sector are not just of low-CO₂ cement and concrete products but also process alterations where the approach

can apply to other sectors. Aside from insights around specific projects, the cement sector can also offer insights on effective ways to initiate collaboration and funding structures. Some of the larger projects in the cement sector, for example the LEILAC project in Belgium and the Norcem Brevik project in Norway, have many partners. This collaborative approach to innovation is far rarer across other hard-to-abate sectors, where individual companies are much more likely to go it alone. There are a lot of lessons to learn from this 'collaborative approach to competition,' which I feel will be crucial for effective decarbonisation in the hard-to-abate sector.

GC: What can other hard-to-abate sectors teach the cement sector?

IR: In the cement sector's quest for net zero CO₂ emissions the traditional levers of process efficiency, alternative fuels and lower clinker factor are only going to get us part of the way to zero net carbon emissions. Most of the new technologies are coming from outside of the industry.

There are many possibilities, which the WCA and its members are looking at alongside Decarb Connect. Indeed, many of these will only be revealed as its networks develop. However, one example that I have become aware of recently is the methanation of flue gases, which has its roots in the oil and gas sector. Instead of capturing the CO₂ and storing it or transporting it for

Below: Decarb Connect offers a platform for rapid information exchange, collaboration and improved decision making, with the aim of speeding up the low-CO₂ transition.





some other use, methanation combines renewably produced hydrogen with a portion of the flue gas CO₂ to produce methane. In the cement sector this could then be fired in the kiln, substituting coal. This would reduce the amount of CO₂ that needs to be captured to just that from the process (i.e. from the limestone), which will help the economics of CO₂ capture and storage / utilisation (CCUS).

There are also various technologies that inject CO₂ into concrete products, use it to form synthetic aggregates or to beneficiate supplementary cementitious materials like fly ash. Overall, there are probably greater opportunities for the use of CO₂ from other sectors in the building materials sector than the other way round. The trick, however, is to be flexible, as local conditions will affect what is viable in any given situation.

I think we will see the measurement of embodied CO₂ stretch out the cement industry 'silo' that Alex mentioned earlier, to fully include supplementary cementitious materials (SCMs) for example. How do you share the emissions, however, from fly ash and slag, for example? The steel industry and cement industry may not see eye-to-eye and that disagreement cannot continue if we want proper decarbonisation in either sector. The way such emissions are accounted for needs to be resolved, because, until we can do that, the full picture will be hard to see. It is the same story with alternative fuels, where the CO₂ emissions can get lost in the gaps. Discussions like those taking place under Decarb Connect's network will help us to reach appropriate solutions.

Below: The cost of decarbonisation can be passed along more easily to end consumers in sectors other than cement.



GC: Is the cement sector harder or easier to abate than other hard-to-abate sectors?

IR: The big challenge for our sector is that the majority of the emissions from cement production come from the process CO₂ rather than the fuel, which is the case with other hard-to-abate sectors. These emissions are inherent to the process. The volume of CO₂ produced compared to the monetary value of the product is extremely high, which puts cement and concrete in a difficult position. The only thing that comes even close is steel. This means that, without incentives, cement producers who reduce CO₂ emissions would not be able to compete with those that take no action. National and regional governments must therefore step in to provide stronger incentives towards the behaviour that they want to see. If you take the EU ETS, it hasn't really worked due to the free allocation system in the cement sector. With Phase Four of the ETS, however, we should finally see much stronger drivers towards low-CO₂ products and CCUS.

AC: I see shared challenges across the hard-to-abate sectors, which certainly apply to the cement sector. Firstly, without the full maturation of the market for low-CO₂ products, there will be a hesitance for manufacturers to fully invest in ways to make them. While some buyers are starting to factor CO₂ emissions into their specifications, this is not the default approach. Ian points towards the need for incentives from government. One such incentive could be for government projects to specify low-CO₂ building materials and to mandate low-CO₂ options for large private projects.

GC: How can Decarb Connect and the WCA speed up decarbonisation?

AC: We need to open up channels of communication, which is one of Decarb Connect's major strengths. This improves decision-making and enables better informed decisions to be taken more quickly, which speeds up projects.

In the longer term, the aspiration for Decarb Connect is to bring policymakers to properly develop the market for lower CO₂ products. Our online event in January 2021 was an early step in this journey.

IR: All media can help to make people aware that governments have an essential role to play. Governments keep talking up the need to decarbonise, but then have a tendency to step back from action.

GC: Where is decarbonisation gaining most traction at present and where is it lagging behind?



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Right: Renewably-generated hydrogen could be combined with flue gas CO₂ to produce methane for cement production, a process known as methanation that is used in the oil and gas sector.



IR: From a cement technology standpoint, the majority of relevant technology is coming from the US. There has also been a recent change in tone from the Chinese cement industry, where the government, of course, has now committed itself to net zero CO₂ emissions by 2060. India is potentially very vulnerable to climate change, and there has been an awakening in the very substantial cement industry there in recent years.

There is also growing interest in the Middle East and North Africa, for example in Morocco. Turkey, which has major export interests in the EU, is also turning its attention to CO₂ mitigation in anticipation of a possible Border Adjustment Mechanism (BAM) as part of the EU ETS.

GC: What are the best regulations / stimuli that can encourage decarbonisation in general?

IR: It's different solutions for different locations and, as with the technical solutions, the US is a strong area for different approaches. The 45Q tax incentive provides US\$20/t of CO₂ that is geologically stored and US\$10/t of CO₂ used in enhanced oil recovery, for example. In New York state, a credit is ascribed to low-CO₂ building materials in the bidding process for public works. If the extra cost of the lower-CO₂ solution is less than a certain threshold, compared to

the lowest bid with conventional emissions, then the low-CO₂ bid is legally considered to be the 'lowest cost' bid. This is a low-cost way to push forward green products, which as they become more widely-available will drive increased uptake.

On the other side, a cap-and-trade system such as the EU ETS is great in theory but, as we have seen, can have unintended consequences. It worked for the power sector in the EU, because there was no threat of imports. This makes it possible to pass the additional cost of emitting CO₂ to the end consumer. However, as cement demand in the EU has dropped since the ETS was designed, the free allocations were sufficient to cover all emissions and to subsidise exports.

AC: I'll come back to my earlier point about wider development of the market for low-CO₂ products, regardless of the product. So often it feels like governments select a chosen mechanism to reduce emissions and then hammer that home. We need a system-wide view of how governments and private firms procure low carbon products rather than viewing decarbonisation as an add-on to our current systems. At the end of the day, we cannot expect the full cost of CO₂ to sit on the cement producer or steel producer. It has to be distributed across the value chain.

GC: Thank you for your time and insights today.

IR/AC: You are very welcome indeed. 

Right: A CO₂ntainer CO₂ capture unit from UK-based Carbon8 Solutions arrives at the Vicat Montalieu plant earlier in 2020. See more on Page 36. **Source:** Carbon8 Solutions, in *Global Cement Magazine* - September 2020.



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Interview by Peter Edwards, Global Cement Magazine

In discussion: Dr Luigi Di Matteo, Di MATTEO Group



Above: Dr Luigi Di Matteo is the CEO of Di MATTEO Group, a family-run material handling equipment producer that was established by his father Orlando Di Matteo in Beckum, Germany, in 1968. He is heavily involved in the sales and technical sides of the business. Luigi's sister Clelia Di Matteo (below) is company CFO.

Global Cement recently caught up with Dr Luigi Di Matteo, CEO of Di MATTEO Group, to discuss the company's response to the Covid-19 pandemic, plus its wider effects on the use of alternative fuels in the cement sector.

Global Cement (GC): Please could you introduce Di MATTEO Group to our readers?

Luigi Di Matteo (LD): The Di MATTEO Group was established by my father Orlando Di Matteo in 1968. It began by manufacturing components and mechanical equipment for the cement and power sectors. It has since expanded significantly and has developed a reputation at home and abroad as an expert producer of equipment for all kinds of bulk material handling, mechanical and pneumatic conveying systems, silo technologies, mechanical and thermal processing, dosing and, last but not least, as the leading expert for the handling and feeding of alternative fuels. Di MATTEO is proud to be the only company in this field that manufactures all of its products in-house across its four production facilities in Germany. At present it employs around 240 people and is represented by offices worldwide.

GC: How did the Covid-19 pandemic affect the group's day-to-day activities?

LD: Due to the fact that Di MATTEO makes everything in-house, we were fortunately able to be fairly self-sufficient. However, there were of course some issues with the pre-products.

Elsewhere, our daily business was affected by the forced hard switch to digital working. Thankfully, this worked far better than expected. I was positively surprised.

Of course, the challenging and dynamic hygienic regulations affected all company departments. To date, we are grateful that the vigilance of our staff has ensured no Covid-19 cases within the workforce. Thanks at this point to our all team!

In terms of ongoing projects, there were some inevitable delays. However we had some experience of running remote commissioning in the past. We increased our efforts in this area.

GC: How were new enquiries during 2020?

LD: Fortunately, many clients have realised that the only way to improve their competitiveness is to reduce operational costs by increasing their use of alternative fuels. Indeed, one of the key points in the successful implementation of alternative fuels is the realisation that the most profitable investment in the long-term may be not the cheapest solution in capex terms, but rather the most available and reliable solution. Due to the constant drive for higher alternative fuel use and Di MATTEO Group's high-quality 'Made in Germany' approach, our



Below: Outside one of Di MATTEO's production facilities, in Beckum, North Rhine-Westphalia.





Alternative Fuels business unit saw a more or less 'normal' year in 2020. This was not the case in other parts of the business. However, compared with many other companies in our industry, and also with other industries, I think DI MATTEO Group can be quite satisfied.

GC: Have the types of waste being processed changed as a result of Covid-19?

LD: It is difficult to have a reliable overview about the global waste streams in 2020 up to now, but in many application and preparation plants we observed a slightly better waste composition. In this context, 'better' means higher calorific value. From the sites in Germany that we were able to inspect in 2020, it seems that the content of highly-calorific cardboard, paper, foils and plastics has slightly increased. Whether or not this is sustained into 2021 will become clear in due course. Due to travel limitations, we have been unable to establish many trends elsewhere. Anecdotally, we hear that the opposite has happened in Eastern Europe. At all times, it is important that we remember: changes could have happened regardless of Covid-19. It is difficult to link the effect and possible cause.

GC: Which world regions were most / least affected within the cement sector, as reflected in enquiries made to DI MATTEO Group?

LD: There is no region that could be defined as exceptional in 2020 due to the pandemic. However, in a parallel development, we expect improvements in the US in the coming months.

GC: Is this Biden-related?

LD: Indeed. There has not been much activity in the US in terms of alternative fuels over the past 4-5 years due to the political climate and we hope there will now be an increased emphasis on environmental management going forward. The US is currently not a particularly major market for us, so this will hopefully develop strongly.

GC: Do you think that the pandemic has affected the quantities or types of wastes traded?

LD: This is very difficult to evaluate in global terms and we have almost no data. I do know that shipments of waste leaving Germany for the Far East were around 10% lower in 2020 compared to 2019. However, the causes of this – was it Covid-19 in addition to the new waste import rules in Asia – and the effects on alternative fuel production in Europe, are both unclear.



GC: Can you comment on the development of automation during the pandemic?

LD: DI MATTEO is not and has never been a fortune teller. However, as I alluded to in an earlier answer, we had fortunately developed and improved our remote features, especially in our well-known WeighTUBE® weighing system since its introduction in 2012. Therefore we were able to support and commission our WeighTUBE® systems during the pandemic worldwide without major issues. Indeed, we commissioned nine alternative fuels installations in 2020 without being on site, in Asia, Africa, Europe and Germany. I am proud that our team was able to manage this challenging and new type of job successfully. Thanks to our forward-looking technology we are ahead of some of our competitors in this regard right now. Of course, we have also learned a lot and we need still to improve our services further in the future.

GC: Were commissioning engineers able to work on more than one project at the same time?

LD: This happened quite a lot and there were certainly efficiencies to be gained. Of course this would have been impossible if they were actually on site, so this is one advantage of remote working.

Above: DI MATTEO Group commissioned nine of its WeighTUBE® systems remotely during 2020 as it successfully worked within the constraints of the Covid-19 pandemic.



Below: Production of a surface feeder for unloading alternative fuels from trucks.



Above: DI MATTEO Group has enacted strict hygiene and social distancing protocols, enabling production to continue, while avoiding any cases of Covid-19 among its workforce.

GC: Will remote commissioning become a feature rather than a bug in the post-pandemic world?

LD: Our preference remains to have our team on-site, so that it can support our clients throughout the commissioning process personally. I think it remains our clients' preference too. However, remote services and commissioning will definitely become an important feature. DI MATTEO is ready for this.

GC: How do you think the global cement industry (and alternative fuel projects specifically) will develop during 2021?

LD: It is hard to predict, but we are quietly optimistic that the cement industry will remain stable and hopefully not be as badly affected as some other sectors. So far this seems to be the case.

GC: What aspects of 'pandemic life' do you think will be retained post-Covid?

LD: I think we will keep some of the improvements that have been brought to us by the forced digitalisation, particularly video conferences and virtual events. Every business trip, for example, always contains a certain percentage of unproductive travel time. For example, I have been stopped from taking long and frequent international trips and have discovered, to my surprise, that I can have several virtual meetings spread globally in one day *and* can still relax at home in the evening. This is a new experience, which offers a new approach to

Below: The proportion of highly-calorific wastes, for example paper, foils and plastics, handled in Germany rose during 2020. Whether or not this is a direct effect of the pandemic remains to be seen.
Credit: Rebeca Bolanos / Shutterstock.com.

business in the future, even though I am a sceptic when it comes to work/life balance!

LD: What lessons has DI MATTEO Group learned during the pandemic?

LD: The biggest thing was that the effort we invested in producing all products in house was worthwhile. In 2020 this was one of our biggest advantages. We did not depend on others and, while problems rose up from time to time, we could ensure fast and strong support for our clients. This encourages us also for the future to keep the 'Made in Germany' philosophy as strong as possible.

Another thing we will take away from the pandemic is the benefits of effective remote communication. As you know there are many platforms on the market. We have chosen Microsoft Teams as our standard platform. I think the name describes one of the most important lessons we can learn from the pandemic: We can only be successful and survive if we accept that we have to work together in a team! A lone wolf is not able to survive in such conditions. The whole team depends on each single team member and vice versa.

GC: It seems that DI MATTEO has ridden the Covid-19 storm well so far. How can it develop its position to take advantage in the future?

LD: The foundation is always to keep your customers happy. We will always strive to do this. At present we are looking to increase the level of automation across our product range so that we can duplicate the remote commissioning success of the WeighTUBE® in other areas. We have been 'forced' somewhat down this road, but we see a number of benefits. As we go, we must be careful to involve sceptics and older members of staff that may be less comfortable with remote working, both within DI MATTEO Group and at the client end.

GC: Thank you for your time today Luigi.

LD: You are very welcome indeed.



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Interview by Peter Edwards, Global Cement Magazine

In discussion: Thomas Laxhuber STELA Laxhuber GmbH

Global Cement recently caught up with Thomas Laxhuber, the CEO of STELA Laxhuber, which produces equipment for the drying of alternative fuels in the cement sector.



Above: Thomas Laxhuber is the CEO of STELA Laxhuber GmbH, a family-owned company that was founded by his grandfather Stefan Laxhuber in 1922. He is responsible for projects, sales and technical development.

Below: The STELA Laxhuber headquarters and production facility in Massing, Bavaria.

GC: Please could you introduce STELA Laxhuber?

Thomas Laxhuber (TLX): The company was founded in Massing, Bavaria, Germany in 1922 by my grandfather Stefan Laxhuber. It started out by working in the agricultural sector.

In the 1960s the company made its first dryers for corn and wheat, which spread the company's name in Bavaria and, subsequently, Germany. In the 1980s it developed the first low-temperature belt dryers for food and non-food applications and, in the early 2000s, it secured its first references in biomass dryers in the pellet and energy sectors.

In 2021, STELA Laxhuber has 220 employees and we expect to handle 100-120 drying projects during 2021. We already have 350 low-temperature belt dryer references for nearly 30 applications worldwide.

GC: How did STELA first become involved in the cement sector?

TLX: We have worked with cement sector clients to dry alternative fuels since 2015. The motivation for us is to help lower the CO₂ emissions of this energy-intensive sector. STELA now offers tailor-made modern solutions for drying plants for refuse-derived fuel (RDF) and solid shredded waste (SSW). I would say that the approach of using these low-temperature drying belts is causing a sensation within the industry.

GC: How does STELA contact new clients in the cement sector?

TLX: A lot of new contacts these days come online, especially since the onset of the Covid-19 pandemic. We are also gaining a strong reputation within a number of industrial sectors, which is the most important factor for the generation of important leads. Our sales department of five people covers the global sales activities via regular contacts, on site visits and by virtual tours through the STELA world.

GC: What equipment is now offered to the cement sector?

TLX: STELA offers low-temperature belt dryers of varying capacity of 3.0-8.4m wide. They are fully customisable in terms of length, typically up to 30m. A common application would require a raw material throughput of 12-15t/hr.

The dryers are heated using the exhaust gas from the clinker cooler (typically 120-300°C), which is diluted to a mild process temperature of ~80°C. This prevents melting and/or degeneration of alternative fuels, for example of plastics.

GC: How is a dryer manufactured?

TLX: STELA's starting point is always the client's request, its individual site conditions and the material to be dried. As your readers will know, there is no globally-defined





specification for RDE, for example, so finding out about the material in hand is crucial.

After agreeing on the contract, a mutual exchange of detailed engineering can start between the project engineering team at STELA and the client. This typically lasts 10-12 weeks. Production time then lasts 12-20 weeks depending on the complexity of the dryer in question.

GC: How does STELA typically handle commissioning of its equipment?

TLX: Installation has traditionally always been carried out by a STELA chief fitter supported by local assistance from the client. Later on in the process, these are mostly the operators. Electrical and programming can be done on a turnkey basis by STELA or, alternatively, by the client, with advice from STELA. At present, the Covid-19 pandemic means that many dryers are set up remotely, in close contact with the customer.

GC: How are orders from the cement sector changing at present?

TLX: We carried out 10 projects in 2020, all for big international players. These were mainly in Europe, the Middle East, but also from North America, Asia and Australia.

All projects are different, with customised situation at site in terms of placement, integration of raw materials and target moisture content for the dried material. We are flexible regarding customer requests and can meet them thanks to our in-house production and use of standard components. This enables fast and reliable project execution.

GC: What effects has STELA experienced so far during the Covid-19 pandemic?

TLX: Thanks to the construction of the new STELA manufacturing building in 2016, we were in the luxurious situation of having a lot of space in the workshop. This enabled us to carry out much of our work with minimal changes. Where this was not possible, we adopted stringent hygiene and social distancing concepts.

More widely, we experienced no major delays in ongoing projects themselves, but they were not without new challenges in terms of installation, commissioning and service of the equipment. Much of our work in this area was taken online, as I mentioned earlier.



GC: Were new orders affected?

TLX: Due to the long term nature of our projects, new enquiries were unaffected. Indeed, the need for reduced CO₂ emissions are more vital than ever.

GC: What are STELA's expectations for its cement sector activities in 2021?

TLX: The drying of alternative fuels will become the third significant industrial key sector within STELA's business model, alongside the biomass and panel board industries. Already in 2021 we have five projects on order and more in the planning phase.

Above: The new STELA production facility includes more than 3000m² of storage area.

Below: In-house production ensures shortest project delivery times.





Above: Each dryer is unique. In the preparation of alternative fuels this is essential.

GC: What lessons has STELA learned from the pandemic so far?

TLX: First of all it is important to keep distance and hygiene in people's minds. This is not particularly complicated but sometimes people have to be reminded. The bigger problem is the increasing frequency of changes to Covid-related regulations. We have to react very rapidly to current needs. Thankfully, the fact that we are small enough to keep internal bureaucracy low means that we can react rapidly to these. Of course, we have to focus not only on the situation in Germany, but also in all of the countries where our customers operate in order to provide adequate service for the machines. Organising this takes a lot of manpower but we have met our clients' needs.

GC: What aspects of pandemic-life will be retained afterwards?



TLX: A lot of meetings that 'needed' travel before the pandemic will remain virtual. For STELA, this means video conferences in the project phase. Even video-assisted customer support and after-sales service will stay in some way. However, physical meetings will also return to some extent – in the end, I think we can capture the best of both worlds.

GC: Thank you for your time today.

TLX: You are very welcome indeed.



Right and Above Right: STELA installed 10 dryers for alternative fuels in 2020, despite the Covid-19 pandemic.





Veolia North America

Wind turbine blades as a cement alternative fuel and raw material replacement

On 8 December 2020 GE Renewable Energy signed an agreement with Veolia North America to recycle its onshore wind turbine blades in the US. This recycling contract, the first of its kind in the country's wind turbine industry, will turn the blades into a raw material for use in cement manufacturing.

In order to turn the blades into raw material in the US, Veolia will use a co-processing solution that has already proven its effectiveness in Europe. Once removed from the wind turbines, the blades, which mainly comprise fibreglass, will be shredded at a Veolia plant in Missouri. Located 110km north west of St Louis, the site employs 20 people. The resulting material will then be used in cement kilns to replace part of the coal, sand and clay needed to make cement. More than 90% of the blade will be reused: 65% as raw material in the clinker and 28% as an alternative fuel to fire the kiln.

According to Quantis US, the net effect of blade recycling through cement kiln co-processing is a 27% reduction in CO₂ emissions and a 13% reduction in water consumption. A single wind turbine blade that weighs 6.3t recycled through this process enables the cement kiln to avoid the consumption of nearly 4.5t of coal, 2.4t of silica, 1.7t of limestone as well as nearly 1t of additional raw materials.

The use of wind turbine blades also has a net-positive environmental impact on human health, ecosystem quality and resource consumption efficiency. The resulting cement has the same properties and performance as cement manufactured using traditional means, meeting applicable ASTM standards.

“Sustainable disposal of composites such as wind turbine blades has been a challenge, not only for the wind turbine industry, but also for aerospace, maritime, automotive and construction industries,” explains Anne McEntee, CEO of GE Renewable Energy's digital services business. “Veolia's unique offering provides the opportunity to scale up and deploy quickly in North America, with minimum disruption to customers and significant benefit to the environment. We look forward to working with them on this effort to create a circular economy for composite materials.”

Bob Cappadona, COO for Veolia North America's environmental solutions and services division, added, “By recycling wind turbine blades for use in cement manufacturing, we reduce the amount of coal, sand and minerals needed and so produce greener cement. We have processed more than 100 blades so far and our customers have been very pleased with the product. Wind turbine blade repurposing is another example of Veolia's commitment to a circular economy and ecological transformation in which sustainability and economic growth go hand in hand.” GE Renewable Energy is committed to reducing environmental impacts throughout the life cycle of its products, including by achieving carbon neutrality by the end of 2020. 

Below: Used GE Renewable Energy's wind turbine blades now find a new use as an alternative fuel and raw material for cement production thanks to the new contract between it and Veolia North America.





US: Argos USA receives competition fine

A US court has fined Argos USA US\$20m for violations of antitrust rules between 2011 and 2016 with regards to the ready-mixed concrete market. The subsidiary of Colombia-based Cementos Argos has admitted to collusion with another ready-mix producer. The US Department of Justice says that the companies coordinated price rises, submitted collusive non-competitive bids to customers, allocated markets in Southern Georgia and elsewhere and charged fuel surcharges and environmental fees.

Argos says the conspiracy was committed by “a small number of former employees of a small, local sales office” that joined Argos when it acquired another company, according to Reuters. It added that its management “did not participate in or condone the conduct, which was undertaken in contravention of company compliance policies.”



France: Lafarge France to upgrade Javel concrete plant

LafargeHolcim subsidiary Lafarge France has announced a planned upgrade to its 120,000m³/yr Javel concrete plant involving a capacity reduction to 80,000m³/yr. It says that this corresponds to the significant reduction in the production capacity of the future Mirabeau power station and ‘the expectations of residents and public authorities.’ The company has described the project as a ‘modernisation’ and from 2023 it will see at least 50% of its production become low or very-low carbon concrete products.

The producer said “LafargeHolcim’s approach by requesting the withdrawal of the existing authorisation thus consolidates its commitments vis-à-vis the stakeholders in the consultation process. The enforcement of the environmental controls announced by Paris Seine Normandy Ports (HAROPA) will of course be maintained and LafargeHolcim is fully in favour of maintaining the strictest controls on the part of the state services.”

UK: Jeremy Greenwood to chair UK Concrete

The Mineral Products Association (MPA) has appointed Jeremy Greenwood as the Chair of UK Concrete. He will work with Chris Leese, the Director of UK Concrete, to coordinate the work of the Concrete Centre, MPA Cement, British Ready-mixed Concrete Association (BRMCA) and British Precast on the roadmap the sector is implementing to go ‘Beyond Net Zero by 2050.’ Greenwood previously worked for Tarmac as its managing director, having been at the company since 1988.

Americas: Cemex launches Vertua concretes in Mexico and the US

Cemex has launched Vertua, a range of low and net-zero CO₂ concrete products, in Mexico and the US. Vertua uses a geopolymers binder solution created by Cemex’s Research and Development Center in Switzerland. It forms “one of the main components of the ambition to deliver net-zero CO₂ concrete for all products and geographies by 2050,” according to the company. The range consists of Vertua Classic, Vertua Plus and Vertua Ultra.

In the US, the company has begun by selling Vertua Classic – which it says offers a 20–30% reduction in CO₂ emissions – in Bay Area, Central Valley, Los Angeles, Sacramento and San Diego, California. Vertua Plus and Vertua Ultra products will be introduced in 2021.

Ricardo Naya, the president of Cemex Mexico, said “With Vertua, we are taking a decisive step in addressing climate change in Mexico and the world, by offering a line of concretes with up to 70% lower carbon emissions. In Cemex, we embrace the circular economy concept and put it into action by offering our customers solutions like Vertua to keep them at the forefront of sustainability efforts.”

California regional president Francisco Rivera said “Since many customers are motivated to reduce the carbon footprint of their projects, we are delighted to offer Vertua Classic, which is suitable for a wide range of commercial and residential applications. Our Vertua products are uniquely designed to balance limited carbon specifications with our customers’ needs for high-quality performance and resilience.”

Singapore: Two record concrete pours for Pan-United

Pan-United has achieved Singapore's two largest continuous concrete pours during the construction of foundations for a development in the city state. The Group's subsidiary, Pan-United Concrete, set a national record when it poured 18,916m³ for 57hr non-stop from 31 October to 2 November 2020. This first pour was followed by a second pour of 18,342m³ in just 42hr on 27-29 November 2020. At the peak of the pours, Pan-United's concrete mixer convoy delivered one truckload of concrete every minute. The total concrete volume of the two pours, at 37,258m³, is equivalent to filling 14 Olympic-sized swimming pools.



UK: Cemex supplies Vertua concrete for Leeds Climate Innovation District

Cemex UK has supplied 70m³ of Vertua Classic concrete to the site of Citu's upcoming office building in its Climate Innovation District in Leeds, West Yorkshire. It will provide the building's foundations. The company says that it has a 30-50% lower carbon footprint than a standard mix. It produced the concrete at its Leeds ready-mix plant.

Ready-mix technical manager Tracey Carden said "We are very proud to have supplied our Vertua Classic concrete to the latest phase of work at Citu's Climate Innovation District in Leeds, particularly as this will be their head office. This is a development that prioritises sustainable construction, making our low-carbon concrete the obvious choice for the office building foundations."

HOW SAFE ARE YOUR PRODUCTION BUILDINGS?



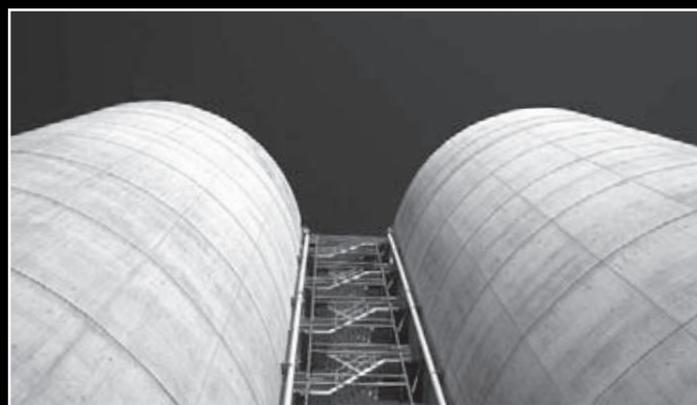
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How safe are your production buildings? A different perspective

The structural stability, especially of the main production buildings in a cement plant, is essential for smooth operation, regardless of how the equipment itself performs. However, it is inevitable that the buildings will suffer damage during their long lifetime under heavy operation condition, resulting in structural deterioration. When the management becomes alert about the stability of affected buildings, an important question arises: What is the risk of continuing operation without taking action? In many countries the owner is responsible by law for the stability of their buildings. This article shall illustrate the measures that can be taken to handle structural deterioration of main production buildings besides the regular maintenance by the plant team. Furthermore, what actions can be taken as an alternative to structural strengthening or demolition?

In general structures are designed for a 50-year lifetime, according to the present Eurocode. However, cement plants under heavy duty operation may suffer strongly and show heavy damage in a shorter time-frame, as shown in Figure 2. Figure 1 shows that the deterioration of reinforced concrete structures rises exponentially with time. Therefore, it is very difficult to determine the exact time of an eventual collapse (Point 4).

It is therefore extremely important to perform a professional investigation of the main production buildings with a view to their structural integrity and stability in addition to regular inspections by the plant team. Cement plant buildings need to be regularly inspected from a structural point of view as well as the equipment they contain and damage or deterioration should not be ignored. Regular repair and maintenance save costs and ensure smooth operation without unpleasant surprises. At the end of the day, the sum of ‘small repairs’ is more beneficial than waiting for a complete renovation of the plant. In other words, the earlier the repair is performed, the longer the lifetime will be. Even the cost

balance is more efficient. This is shown in Figure 3.

The interval between structural investigations depends on the life cycle of the plant and its general condition, but an interval of 4-6 years is a good guideline for most cement plants. The structural investigation can be done in the following two steps.

1. Preliminary preparation work: This involves gathering and reviewing the main structural key data and existing overview drawings of the buildings of interest prior to a field trip. It is an essential step. Unfortunately, as-built data is often missing (calculation notes, reinforcement drawings, structural steel drawings, construction and workshop drawings...etc.). However, simple sketches showing main dimensions, even if just taken from the plant layout, and overview pictures could be of great help. Office-based preparation makes the inspection on site much easier and saves a lot of time.

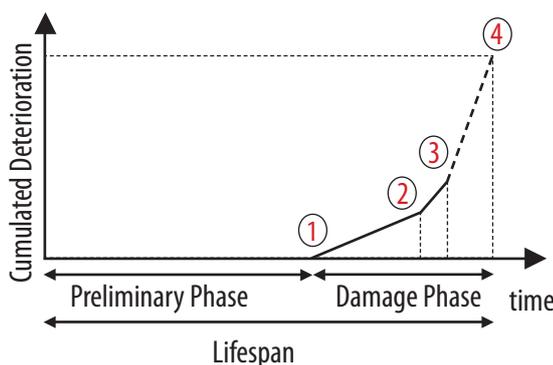
2. Main investigation: This is performed on-site and comprises the following steps. First, a detailed visual inspection on site, including photo documentation, is to be performed. Secondly, a plan for sampling is to be prepared for taking samples by local laboratory. This includes chloride contamination tests, carbonisation levels and compressive and flexural strength, as well as other parameters. The utilisation of structurally-relevant elements is to be reviewed by means of the existing or new calculation notes, reinforcement drawings and the estimated degree of damage. Finally, the structures are to be categorised into risk classes from the structural point of view as shown in Figure 4.

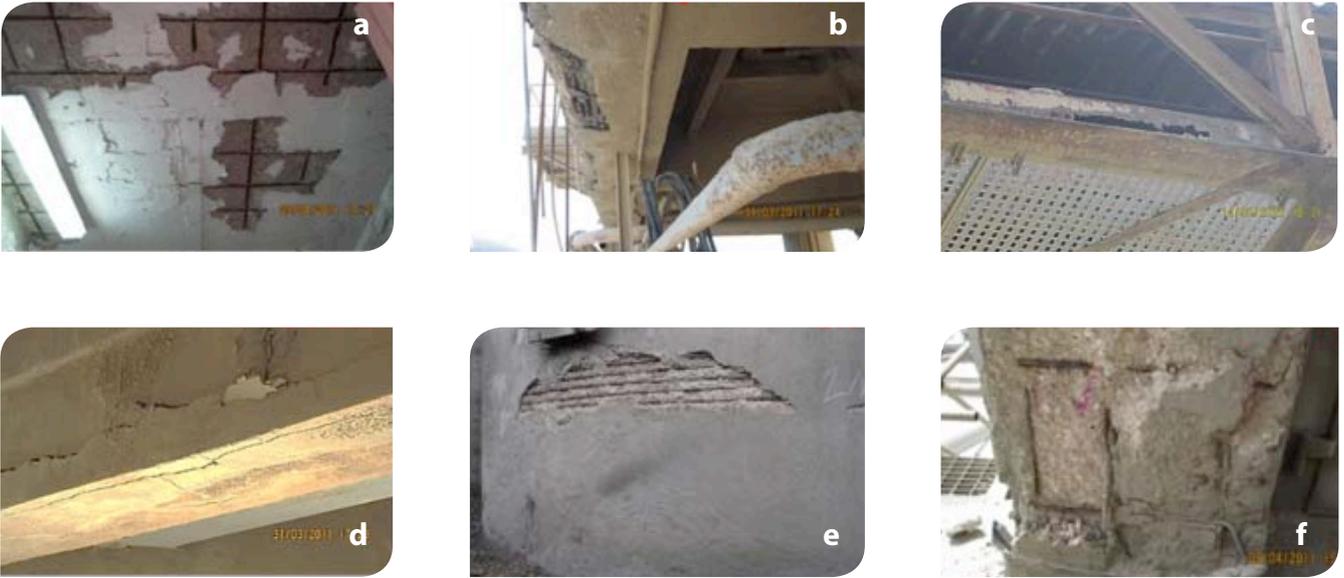
The inspection report and possible options in

Right - Figure 1: Time-dependent process of cumulative deterioration of reinforced concrete structure due to corrosion of reinforcements.

1. Depassivation of reinforcement.
2. Crack development.
3. Spalling of concrete.
4. Collapse.

The corrosion of reinforcement takes place between points 2 and 4.





Above - Figure 2: Typical structural damage within a cement plant:

- a) Slab;
- b) Preheater;
- c) Conveyor bridge;
- d) Beam;
- e) Silo;
- f) Column.

terms of operation needs, available time and budget are then to be discussed with the owner. A maintenance masterplan with respect to priority, not only from the structural point of view, but also considering production needs and strategy of the cement producer, is to be prepared. After a decision is taken by the owner, a repair and strengthening design can be completed.

Even now at the time of the Covid-19 pandemic, site assessment of buildings of inland cement plants can be done almost as usual without taking additional measures, except following the corona health guidelines, like wearing masks and gloves, keeping distance... etc. However, due to the limitations of travelling, inspection on site abroad can be done by a local office. This can include making crack maps, taking concrete cores, Schmidt Hammer testing, carbonisation testing, chloride samples... all under the direction of the structural repair expert abroad. Evaluation of the site assessment, followed by a structural investigation, in addition to repair or strengthening design, can then be prepared by the structural repair expert.

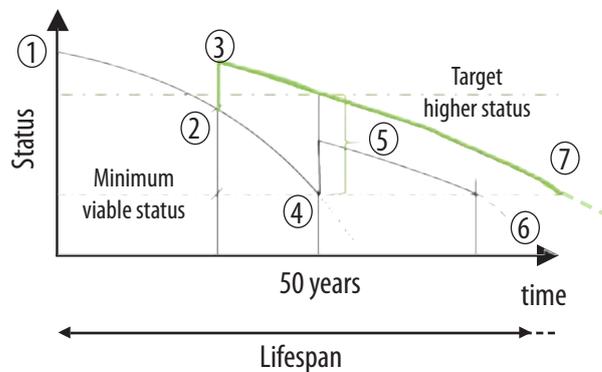
It is worth mentioning that, depending on available documents (construction drawings, calculation notes, photo documentation of building status...etc.), remote diagnostics can be performed by the structural repair expert away from the site.

Is it safe?

To evaluate any damage, a structural repair expert is needed, as the degree of damage alone does not give a conclusion regarding the risk level. High damage does not always mean high structural risk and vice versa. For example, a high damage at a structural element with low utilisation may be less critical than a small damage at a structural element

with high utilisation that doesn't have adequate residual structural safety.

Further, the cause of damage is of importance for a comprehensive analysis of repair or strengthening method to be best chosen, whether the damage is due to weak design, bad construction, new additional loads, ageing effects or other causes.



Left - Figure 3: Comparison of present status with target status. Green line shows status in the event of early repair.

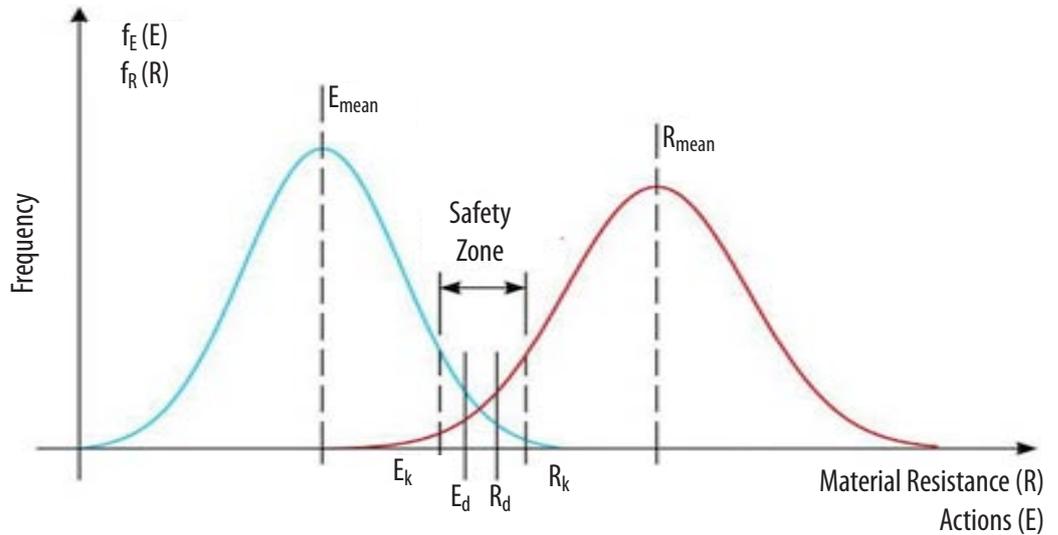
1. New building.
2. Inspection.
3. Early repair.
4. End of lifetime after 50 years and repair.
5. Improvement in status leads to longer lifespan.
6. End of lifetime with late repair after 50 years.
7. End of lifetime with early repair.



Left - Figure 4: Example of a plant layout showing the categorisation of the structures into risk classes.

- Extreme risk - Cordon off area.
- High risk - Repair within 12 months.
- Medium risk - Repair within next three years.
- Low risk - Repair within next 10 years.

Right - Figure 5: Eurocode design safety concept.



Maintenance of buildings

After performing a structural investigation and setting up a maintenance masterplan for buildings of interest, repairs with respect to strengthening the existing design can be undertaken. The structural engineer and repair expert must be aware of the design codes and standards developed over the years. Hence, the repair design of 40 to 50-year old structures is often far from straight-forward. Special considerations must be considered and discussed with the owner in order to take the right decisions. For example, if repair design should follow the present Eurocode, it is important to remember that the existing damaged structures were most likely designed according to local standards 40 to 50 years ago. At that time the safety of a construction was defined by only one global safety factor. The design was relatively simple, based on deterministic values.

The present safety concept according to Eurocode is based on semi-probabilistic theory. The relevant parameters are evaluated based on statistical evaluation for the material resistance (R) as well as the actions (E). The 'safety factor' becomes a variable safety zone as given in Figure 5. Even the load assumptions (actions, such as wind, earthquake, snow ... etc.) have been changed since the establishment of the Eurocode. The main differences to be considered between former design standards and present codes such as Eurocode are load and actions, material properties, design philosophy and approach. Nevertheless, local conditions must be considered as well in the repair/strengthening design.

Therefore, it is of great importance for the owner to decide whether to follow present code or to follow the design code of the time of construction. Despite the technical aspects and economical views, there may be legal aspects to be respected, to which the design code **must** adhere. For example, in Germany when significant changes in supporting elements are to be performed, or the structural sta-

bility is endangered, then the present design code must generally be followed.

Using the Eurocode for repairing and strengthening designs could be beneficial, not only to gain a durable structure following the repair, but also to reduce the load combinations acting on the structure, such as live load, wind and earthquake action, by having the choice of reducing the load combination factors.

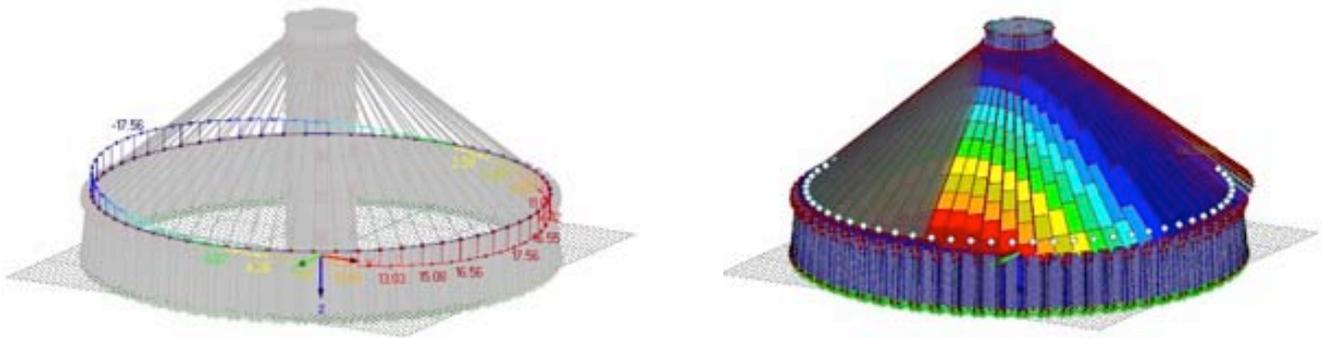
Finally, a planned and organised building maintenance programme, for example during a production shutdown, should be the goal of every production manager, rather than having a forced repair caused by immediate danger at a time not of their choosing.

Monitoring of buildings

What can be done to continue safe operation, despite the observation of severe damage, for example to silos or main production buildings? Are there any alternative options other than classic repair and strengthening?

The answer is yes, with the help of structural analysis in addition to professional monitoring. Installing appropriate monitoring devices can be used to observe the real stress condition of the main structural elements of a building, even during plant operation. Monitoring devices could be strain gauges, crack marks, deformation measuring devices, displacement sensors and many more, depending on the construction and circumstances.

First a structural analysis must be performed to evaluate the residual stability of the construction and safety utilisation. The results of a finite element calculation for a roof deformation of a clinker silo is shown in Figure 6. Safe limits are then to be calculated and discussed with the owner, as shown in Figure 7 with reference to the displacement of roof beam in a clinker silo during operation.



Above - Figure 6: Finite Element Analysis of a clinker silo.

By observing the measurement during operation for an appropriate period, it is possible that the safety of the structure can still be assured despite damage. Monitoring could save cost and time, achieving structurally-acceptable results. This can delay the repair or strengthening work to a maintenance shutdown for example, saving the plant valuable production time.

Summary

In general, cement plants are built to last for many decades. The production buildings suffer under a heavy duty environment and must withstand heavy loads over their lifetime of at least 50 years according to Eurocode. A regular professional inspection of the buildings is therefore essential as for equipment, to maintain a smooth and steady operation.

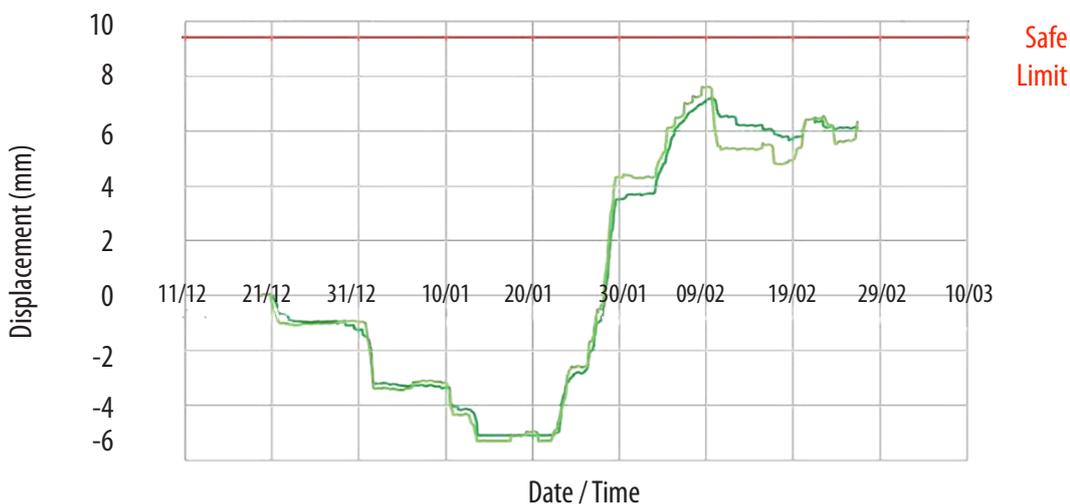
Categorising the production buildings into risk classes and preparing a masterplan for maintenance is important also for capex planning and secure production.

Even in these unusual times, structural inspection and maintenance of production buildings can

be performed at home and abroad. For the evaluation of damage to production buildings, a structural repair expert is needed. It is not recommended to repair the damages without a comprehensive analysis.

Monitoring, besides structural analysis, could be an option for repair/strengthening works, in order to have the production buildings safe despite damage. Hence, time and costs can be saved, if strengthening and repair can be avoided through monitoring. Even if repair with respect to strengthening is required, monitoring could be beneficial to optimise operation.

To achieve best results all four parties, owner, local plant team, consultant/designer/structural repair expert and contractor must work as a team. Performing a structural assessment of main production buildings is important for budgeting planning, especially in the time of coronavirus, to be ahead of the market. 



Left - Figure 7: Monitoring of clinker silo wall deflection using two sensors.



Contents

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France: CO₂ntainer commissioned at Vicat plant

Vicat started using a CO₂ntainer system supplied by UK-based Carbon8 Systems at its Montalieu-Vercieu cement plant in November 2020. It uses captured CO₂ from the unit's flue gas emissions to carbonate cement-plant dust and produce aggregates, which can then be used to make products such as concrete. The system has particular relevance for a plant burning alternative fuels due to the additional chlorinated dust created compared to the use of conventional fossil fuels. The company says it is the first European cement producer to use the process at an industrial scale. Previously, Carbon8 Systems said that its CO₂ntainer would process and convert up to 12,000t of cement bypass dust in its first phase of operation.

Vicat Group scientific director Laury Barnes-Davin said "We were drawn to Carbon8 Systems' two-part technology: capturing the CO₂ that Montalieu emits, and using it to produce an aggregate that can be marketed in the construction industry. It opens up great potential for our operations not just in France but also in all the countries where we work across the globe." The group hopes to reach a 100% alternative fuel substitution rate in France by 2024.



EU: FLSmidth offloads Möller

France-based REEL has agreed to acquire handling and lifting systems specialist Möller (also known as FLSmidth Hamburg GmbH) from FLSmidth for an undisclosed amount. The company employs 60 people and has reported sales of Euro400m/yr.



Senegal: Large Aumund contract for Kirene plant

Aumund Group says that it is supplying conveying equipment to a new production line that will be built at Ciments du Sahel's Kirene plant. The order package includes 23 bucket elevators, seven pan conveyors, 11 drag chain conveyors, two Samson material feeders, four Centrex silo discharge machines and 19 silo discharge gates. The machines will operate in all stages of the production process, from raw materials discharge to conveying between the clinker silo and the cement mill and in the packing plant. Supply will be made in several tranches between March 2021 and June 2021. Commissioning is planned for the first quarter of 2022.

China-based Sinoma International Engineering and its subsidiary CBMI Construction are the main contractors for the project. Aumund France and Aumund China, with support from Aumund Foerdertechnik, are the main divisions of Aumund working on the upgrade.

Ivory Coast: New clinker discharge equipment for LafargeHolcim plant

LafargeHolcim Côte d'Ivoire commissioned a new clinker discharge equipment at its Abidjan cement plant in June 2020 and announced the news at the end of 2020. Aumund France supplied the equipment. It consists of a 75,000t-capacity silo, two Aumund KZB pan conveyors with 10 gravity discharge gates, four Aumund GF belt conveyors and a dedusting system comprising five filters, as well as the complete electrics and automation package for the new discharge system. The supplier says that it also supervised installation and commissioning of the equipment.

Indonesia: Rail deal for Semen Indonesia

Semen Indonesia has signed a memorandum of understanding with rail freight company Kereta Api Indonesia (KAI). Indonesia Government News has reported that the memorandum covers a planned increase in cooperation on rail-based transportation and medium and long-term land leases, the conduct of joint studies into railways and infrastructure and the development of other forms of potential co-operation.



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France: Vicat joins Genvia hydrogen joint venture project

Vicat has joined US-based Schlumberger New Energy, clean energy specialist CEA, Vinci Construction and the Occitan Regional Agency of Energy and Climate (AREC) in a hydrogen production technology joint venture called Genvia. The partnership will establish a 'gigafactory' at which to develop high-temperature reversible solid oxide electrolyser technology. The gigafactory will be situated in Béziers, Occitan. Deployment will take place via CEA's Grenoble, Auvergne-Rhône-Alpes site.

"We are very pleased to be working alongside such experienced and strong partners as we strive to develop technologies that enable decarbonisation," said François Jacq, chairman of CEA. "Together, building on a set of technologies developed by the CEA over the last decade, we have ambitious growth plans for a technology that we expect to be a game-changer in the production of clean hydrogen. This initiative demonstrates an alignment of environmental and

economic growth ambitions that is important for France and Europe in support of the government's and the commission's recovery plan."

The technology Genvia plans to use is intended to achieve a high system efficiency, resulting in less electricity use per kg of hydrogen produced. The venture says that the technology is the first of its kind that is fully reversible, giving it the flexibility to switch between electrolysis and fuel cell functions.



Italy: Federbeton calls for coordinated infrastructure investment

Federbeton, the Italian cement and concrete association, has called for a coordinated infrastructure investment plan to restart the national economy once the Covid-19 pandemic recedes. Cement production has fallen to its lowest levels since the Second World War at 17Mt/yr, compared to 47Mt/yr a decade ago. It is calling on a strategic plan for the sector to make any post-pandemic economic recovery as efficient as possible.



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Germany: HeidelbergCement joins Stiftung 2° group

HeidelbergCement has strengthened its climate neutrality commitments by joining the Stiftung 2° support group, a network of private companies lobbying for climate goals. The group says that it wants to 'develop cross-sector approaches and concepts for Germany and Europe in order to make climate protection a sustainable and successful business model.'

Managing board chair Dominik von Achten said "For the development of a carbon neutral construction industry, we need the right social and political framework as well as strong partners with whom we can also be economically successful on our path to climate neutrality."



Switzerland: Cement deliveries fall in 2020

CemSuisse, the Swiss cement association, says that cement deliveries fell by 1.5% year-on-year to 4.15Mt in 2020. Deliveries remained stable in the first quarter before falling by 3.3% year-on-year in the second quarter at the same time of the first wave of the coronavirus pandemic. They subsequently recovered to a small increase in the third quarter before falling by 3.1% year-on-year in the fourth.



Switzerland: RTO for Wildegg

Dürr is supplying a regenerative thermal oxidation system (RTO) to Jura Cement Fabriken's integrated plant in Wildegg as the main stage in its air pollution control system. The upgrade is intended to enable the cement producer to comply with anticipated lower gas emission limits for carbon monoxide, hydrocarbons, and ammonia. The supplier says its solution combines Dürr's Ecopure RTO multiple-chamber principle with an optimisation of the existing process technology in the calciner. It is scheduled to start operation in 2022.

Jura Cement operates two integrated plants in Switzerland. It is part of the Switzerland-based Jura Materials Group, itself part of Ireland-based CRH since 2000.

Germany: FLSmidth eyes ThyssenKrupp's mining business

Denmark-based FLSmidth has entered into non-binding negotiations with ThyssenKrupp over the possible acquisition of its mining business. Mining is one of ThyssenKrupp subsidiary ThyssenKrupp Industrial Solutions' major businesses, alongside cement. This business segment reported net sales of Euro2.9bn in its 2020 financial year, a small decline from the sales figure in 2019 despite the coronavirus pandemic.



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Poland: Lafarge selects Chinese firm for Euro100m plant upgrade

Lafarge Poland has chosen China's Nanjing Kisen International Engineering as the general contractor for a Euro100m-plus upgrade to its Małogoszcz cement plant. The subsidiary of China Triumph International Engineering will deliver an engineering, procurement and construction (EPC) contract and it intends to select a local Polish subcontractor. This is the first project by the Chinese engineering company in the whole of the European Union.

The first works related to the project started in October 2020. First clinker production from the upgrade is scheduled for December 2022 with overall commissioning planned for spring 2023. Part of the investment will be implemented in cooperation with the Krakow Technology Park as part of the Polish Investment Zone. LafargeHolcim says the upgrade project is part of its scheme to reduce its CO₂ emissions by 55% by 2025 compared to 1990 levels.

Ukraine: Court upholds anti-dumping duties on cement from Russia, Belarus and Moldova

The District Administrative Court of Kiev has dismissed Belarusian Cement Company (BCC)'s claim against the government's Interdepartmental Commission on International Trade for the cancellation of anti-dumping duties on cement. The duties on imported cement are 57% of the value of goods from Belarus, 94% from Moldova and 115% from Russia. The commission introduced the tariffs in late May 2019 and they will expire in late May 2024.

The law firm representing third parties Dyckerhoff Cement Ukraine, HeidelbergCement Ukraine, Ivano-Frankivsk Ukraine and CRH subsidiary Podilsky Cement said "The court recognised the need to protect the violated rights of national cement producers in Ukraine from dumped imports of goods to Ukraine." It added that the imports had caused 'significant damage' to national producers.



Iceland: Dust incident

Sementsverksmidjan, a HeidelbergCement subsidiary, has apologised for an incident which caused cement dust to be released from a silo at its terminal in Akranes, Iceland. An overflow during loading caused the dust to settle on nearby houses. The company worked with fire services, utilities companies and residents in order to clean up the dust.

France: Safety Trophy for Rochefort plant

Eqiom's Rochefort cement plant has won the Safety Trophy from the French cement industry union. The award recognises work to reduce all types of workplace accidents. The subsidiary of Ireland-based CRH also won a safety award for its Chelles terminal, recognising its connected approach to logistics management.

Germany: Four new CEOs for INFORM

INFORM GmbH, a provider of artificial intelligence (AI) driven optimisation software for digital decision making, has appointed four new co-chief executive officers (CEO) alongside Adrian Weiler, the company's CEO since 1986, who will continue in his leadership role. Andreas Meyer, Matthias Berlit, Peter Frerichs and Jörg Herbers all assumed their new roles at the start of 2021. The four new executives hold over 75 years in leading positions at the company. Their appointments are intended to hasten the company's development.

UK: Packing lines for Rugby

Cemex UK has announced plans for two new plastic packing production lines at its Rugby cement plant. The company said that the lines will directly serve the plastic packing needs of packed cement production at the plant. The total investment cost of the installation will be Euro5.6m. Work will begin in early 2021 and will be completed by June 2021. Cemex first entered the plastic packed cement market in 2011.





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GLOBAL CEMENT NEWS: EUROPE



Romania: Holcim donates Euro950,000 to hospitals

Holcim Romania and its subsidiary Somaco have donated around Euro950,000 to local hospitals to buy equipment to manage the ongoing Covid-19 pandemic. 20 hospitals in the counties of Alba, Arad, Argeş, Bihor, Buzău, Cluj, Dâmboviţa, Iaşi, Neamţ, Prahova, Timiş, Vrancea and Bucharest will benefit from the funds. It will be used to buy personal protective equipment and medical equipment such as monitors, ventilators and fans. This latest donation follows one in April 2020, bringing Holcim Romania's total to around Euro1.5m.



Romania: New CEO for Holcim Romania

Holcim Romania has appointed Bogdan Dobre as its CEO. He succeeds Horia Adrian, who held the post for the last three years.

Dobre started working for Holcim Romania in 2000. Originally he worked as Regional Cement Sales Manager before later becoming National Cement Sales Manager and eventually Commercial Director for the company in 2013 until 2020. He graduated from the Organic Chemistry Faculty within Bucharest University and holds an Executive Master of Business Administration (EMBA) from Tiffin University in the United States.



Peter Edwards, *Global Cement Magazine*

Cement in Spain

Global Cement turns its attention to Spain, a country that has seen massive changes to its cement sector over the past 20 years.

Spain occupies around 85% of the Iberian Peninsula in south west Europe, as well as the Balaeric islands in the Mediterranean Sea and the Canary Islands off the coast of North Africa. Easy access to the Mediterranean meant that the inhabitants of the peninsula came into contact sequentially with Greek, Persian, Roman and in the Middle Ages, Islamic and Christian cultures, each of which left its own impression on the peninsula.

In the 1500s the formation of Habsburg Spain unified a number of predecessor Kingdoms into what would become one of the most powerful countries in the world. The country developed a large Empire, with interests in North America, Africa and the Far East. However, it is Central and South America that saw the greatest extent of Spanish influence, with more than 20 countries in the region that have Spanish as their official language.

However, by the mid 1600s Spain saw gradual decline overseas as its colonies gained independence. It also became embroiled in a series of disputes within Europe. This culminated in the Spanish Civil war of 1936-1939, which was won by nationalist forces led by Francisco Franco, who became a dictator. Upon his death in 1975, control of Spain

passed to King Juan Carlos. A steady transition to a liberal democracy could begin, which was completed by free and fair elections in 1982. The country subsequently wasted no time joining the European Economic Community (EEC, now the EU), in 1986 and adopted the Euro currency in 2002.

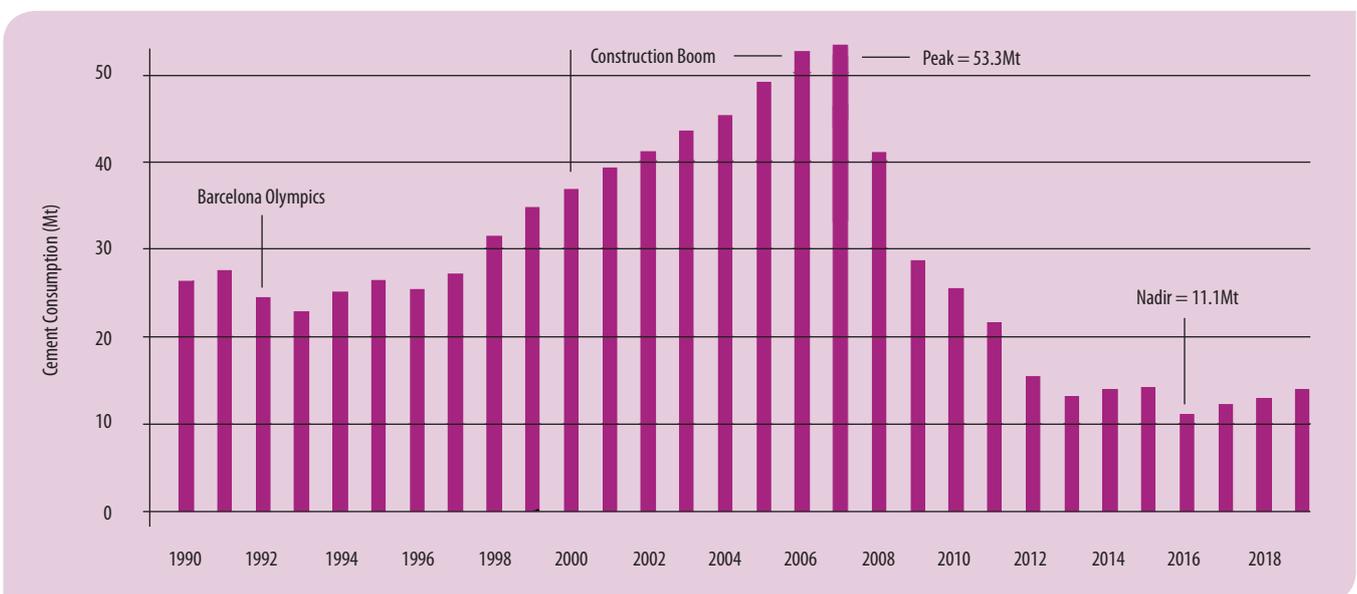
Rapid growth...then a rollercoaster

When Spain joined the EEC in 1986, its GDP/capita rate was 76% of the bloc's average. Thanks to extensive development during the 1990s, however, it had risen to 105% of the average at the point when it joined the Euro. Madrid's income level was 125% of the EEC average.

Spain's economy continued to grow apace during the early 2000s, with low unemployment, rapid construction and extraordinary demand for cement. Indeed, such was the growth curve during this period that Germany's *Die Welt* forecast that the average Spaniard would be better off than the average German by 2011.

This incorrect forecast can be put down to a classic case of over-extrapolation and a failure to foresee the impending global financial crisis, which affected the Spanish economy very badly. Unemployment

Below - Figure 1: 30 years of Spanish cement consumption. **Source:** Oficemen.





rose from around 8% in 2007 to a peak of more than 26% in 2013. The economy, worth over Euro1.3tn in 2008, lost around 30% of its value in the seven years to 2015. The country had to be bailed out by the European Central Bank. Since that nadir, the unemployment rate has steadily declined, to a touch under 14% in 2019, while the economy returned to growth.

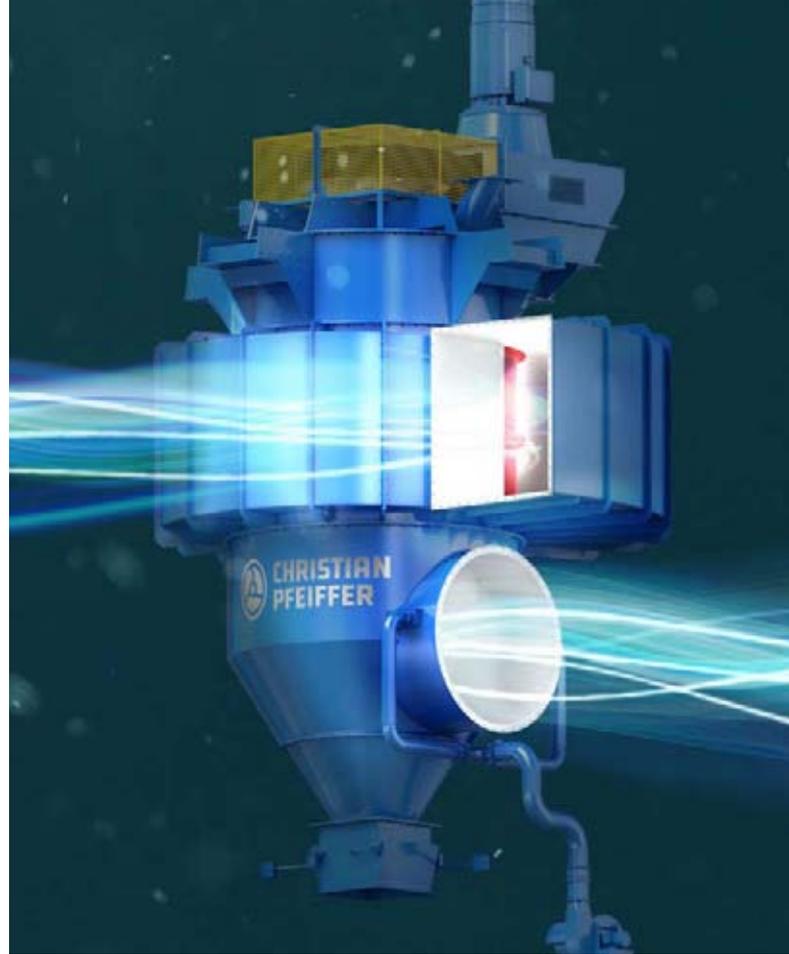
Covid crisis

In 2020 Spain had the 14th-largest economy in the world at Euro1.0tn. Sharing this between its 47.3 million inhabitants gives a per-capita rate of Euro22,043. Like many EU Member States, Spain's economy is dominated by the service sector, to the tune of around 75%. As the second-most visited country on Earth after France, a significant proportion of this is attributed to tourism. The unprecedented reduction in tourism during the summer of 2020 due to the Covid-19 pandemic led Spain's economy to shrink more significantly than other countries of similar size, with a more than 20% contraction during the second quarter of 2020. Younger people, who had already borne the brunt of the late 2000s property boom, were once again disproportionately affected, despite the efforts of the Spanish government to assist with income support and liquidity schemes for small businesses. At the peak of the first Covid-19 wave, some 22% of all salaried employees received some form of support. Given the ongoing second wave of the virus, it remains unclear whether the Spanish economy will be able to mount a recovery during the crucial 2021 summer tourist season.

Cement trends

Demand for cement in Spain began in earnest under Franco in the 1950s, when the country saw significant migration into the cities. Increasing levels of prosperity in the 1960s and 1970s, led to an acceleration in development, including Spain's massive tourism infrastructure. This led to notable imports of cement for the first time. In 1991 production hit a high of 27.6Mt due to construction for the 1992 Summer Olympic Games in Barcelona.

Data from the Spanish Cement Association Oficemen shows that apparent cement consumption more than doubled in the 10 years between 1997 and 2007 from 26.8Mt to 56.0Mt. Then, as the economy turned downwards, cement consumption followed suit. However, whereas GDP fell by 25%, cement consumption crashed by 81% between 2007 and 2013, falling back to levels not seen since the late 1960s. Consumption then skimmed along at this low level for the best part of the 2010s, although there was a rise to 14.0Mt in 2019, a 6% increase on 2018's 13.0Mt. Somewhat alarmingly for the sector, cement exports fell by nearly a fifth in 2019 compared to 2018. These had previously helped many producers to maintain margins in the absence of domestic demand.



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Above - Figure 2: Comparison of Spanish cement production, 2019 and 2020. December 2020 figure was unavailable at the time of going to press, so 2019 figure has been used as an estimate. **Source:** Ministry of Finance and Public Administration.

2020 — (blue line)
2019 — (red line)

Total domestic cement consumption was 6.2Mt in the first half of 2020, a 17% year-on-year fall from 7.4Mt in the first half of 2019. The second quarter was particularly badly affected, with April 2020 volumes half that of April 2019 at under 0.6Mt. However, consumption in June 2020 saw a rebound to levels 5% higher than a year earlier.

Oficemen president Victor García Brosa said “In June 2020 many of the works paralysed during the confinement, for example real estate developments, were resumed, but the monthly positive data should not make us think of a recovery in the sector.”

Indeed, the changes in cement production in 2020 make interesting reading, with the Ministry of Finance and Public Administration now releasing data until November of that year. January saw 1.1Mt of cement produced, with an increase in February to 1.4Mt. In March, instead of a seasonal increase, production volumes fell to 1.3Mt, then to just 0.6Mt in April 2020. This compared to 1.4Mt in April 2019. The production slump was acute, with the remainder of the year performing much more strongly. Production rates returned to ~1.5Mt/month between May and November 2020, broadly matching 2019.

Export story

While Spain had traditionally been a moderate exporter of cement, strong domestic demand meant that its exports were low between 2005 and 2007. However, as domestic demand collapsed, total cement and clinker exports increased nearly 10-fold from just 1.1Mt in 2007 to 9.65Mt in 2014. In 2015 exports fell slightly, falling further towards the end of the 2010s. In 2018, Oficemen blamed falling cement exports on rising electricity prices in Spain and the increased price of emitting CO₂ under the EU Emissions Trading Scheme, which had increased from Euro7.80/t in January 2018 to Euro24.60/t by the start of 2019. Spain exported Euro308m of cement and clinker in 2019, 3.7% of the total global volume traded. The value realised was 23.7% lower than in 2018. This shows that Spanish cement and clinker are finding it increasingly hard-going in the congested Mediterranean Basin region.

Fuels

The Global Cement & Concrete Association’s (GCCA) Getting the Numbers Right (GNR) database shows that conventional fossil fuels accounted for approximately 70% of the thermal energy used to make grey clinker in 2018. Refuse-derived fuels (RDF) accounted for around 18% and biomass around 12%. As the GNR database only comprises

Right The unique octagonal preheater tower of the Cementos Molins Sant Vicenç dels Horts plant near to Barcelona. At the time of *Global Cement’s* visit to the plant, it was the most efficient in the whole of Spain.





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FOSSIL FUELS • 70%

RDF 18%

BIO 12%

data from 23 Spanish cement plants, which collectively made 12.7Mt of clinker, this does not necessarily reflect the entire picture.

CO₂ emissions

The GNR database shows that the mean CO₂ emissions per tonne of clinker fell to 823kg in Spain in 2018, down by 1kg from 2017. Specific emissions were as low as 814kg/t in 2013. It also reports that the clinker factor was 81.3% in 2018.

Cement capacity

The *Global Cement Directory 2021* lists 29 active integrated cement plants in Spain that share a total integrated cement capacity of 41.6Mt/yr. There are an additional 17 grinding plants, providing a further 12.4Mt/yr. This gives the country an impressive

54.0Mt/yr of cement capacity. By this measure, Spain's cement industry is the largest cement industry in the whole of the EU. However, the country's effective capacity utilisation rate is just 25%. Several plants are mothballed, closed or are operating on a campaign basis.

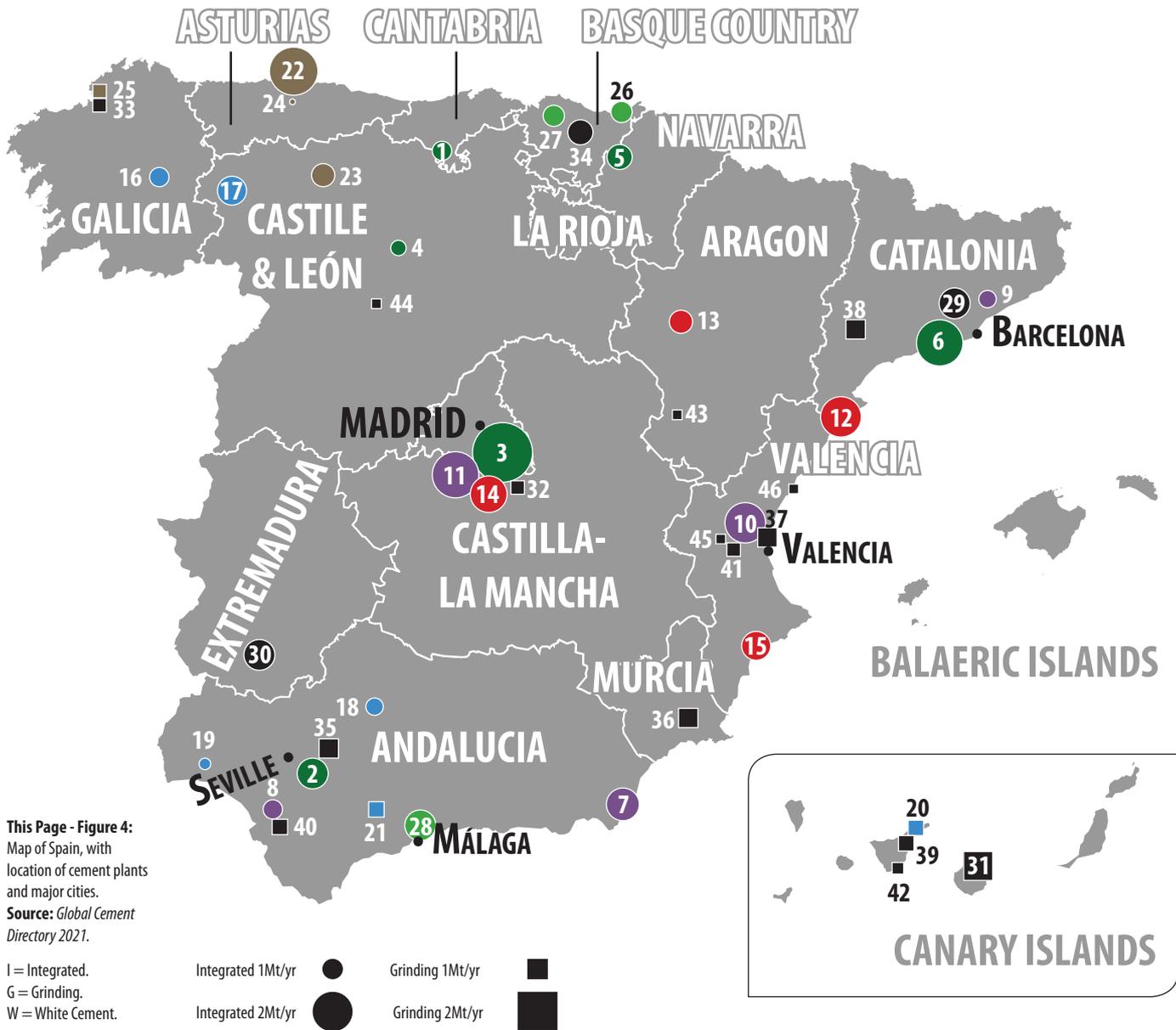
Cement producers

Like many countries in the EU, Spain's cement production base is predominantly owned and operated by major multinational cement producers (See Figure 4). Between them Cemex, Lafarge-Holcim, HeidelbergCement, CRH and Votorantim share 25.2Mt/yr of integrated capacity, around 47%. The remaining 28.8Mt/yr (53%) of integrated capacity is taken up by locally-owned producers, most notably Grupo Cementos Portland Valdeirivas (CPV), which is the

Left - Figure 3: Proportions of different fuel classes used in the Spanish cement sector in 2018.
Source: GCCA GNR database.

Below: Fuels made from waste provided around 18% of thermal energy to Spanish cement plants in 2018.
Source: GCCA GNR database.





This Page - Figure 4:
Map of Spain, with location of cement plants and major cities.
Source: Global Cement Directory 2021.

I = Integrated.
G = Grinding.
W = White Cement.

Integrated 1Mt/yr ●
Integrated 2Mt/yr ●
Grinding 1Mt/yr ■
Grinding 2Mt/yr ■

CEMENTOS PORTLAND VALDERRIVAS • 10.2Mt/yr

- 1. Mataporquera, Cantabria, 1.0Mt/yr (I).
- 2. Alcalá de Guadaíra, Seville, 1.6Mt/yr (I).
- 3. Morata de Tajuña, Madrid, 3.1Mt/yr (I) (0.3Mt/yr W).
- 4. Palencia, Castile y León, 0.8Mt/yr (I).
- 5. Olazagutia, Navarra, 1.3Mt/yr (I).
- 6. Santa María i els Monjos, Catalonia, 2.4Mt/yr (I).

LAFARGEHOLCIM • 8.1Mt/yr

- 7. Carboneras, Andalusia, 1.7Mt/yr (I).
- 8. Jerez de la Frontera, Andalusia, 1.0Mt/yr (I).
- 9. Montcada i Reixac, Catalonia, 0.9Mt/yr (I).
- 10. Sagunto, Valencia, 2.1Mt/yr (I) (0.3Mt/yr W).
- 11. Villaluenga de la Sagra, Castilla-La Mancha, 2.4Mt/yr (I).

CEMEX ESPAÑA • 6.7Mt/yr

- 12. Alcanar, Catalonia, 2.1Mt/yr (I).
- 13. Morata de Jalón, Aragon, 1.2Mt/yr (I).
- 14. Castillejo, Castile-La Mancha, 1.9Mt/yr (I).
- 15. San Vicente del Raspeig, Valencia, 1.5Mt/yr (I).

CEMENTOS COSMOS (VOTORANTIM) • 5.3Mt/yr

- 16. Oural, Galicia, 0.7Mt/yr (I).
- 17. Toral de los Vados, Castile y León, 1.5Mt/yr (I).
- 18. Córdoba, Andalusia, 0.9Mt/yr (I).
- 19. Niebla, Andalusia, 0.6Mt/yr (I).
- 20. Santa Cruz de Tenerife, 0.8Mt/yr (G).
- 21. Bobadilla-Estación, Málaga, 0.8Mt/yr (G).

CEMENTOS TUDELA VEGUÍN • 4.6Mt/yr

- 22. Carreño, Asturias, 2.5Mt/yr (I).
- 23. La Robla, Castille y León, 1.2Mt/yr (I).
- 24. Tudela-Veguín, Oviedo, 0.2Mt/yr (I).
- 25. Narón, Galicia, 0.7Mt/yr (G).

FYM (HEIDELBERGCEMENT) • 3.8Mt/yr

- 26. San Sebastián, Basque Country, 1.1Mt/yr (I).
- 27. Arrigorriga Viscaya, Basque Country, 1.1Mt/yr (I).
- 28. Málaga, 1.6Mt/yr (I).

OTHERS • 15.3Mt/yr

- 29. Cementos Molins, Sant Vincenç dels Horts, Catalonia, 1.6Mt/yr (I).
- 30. Cementos Balboa, Alconera, Extremadura, 1.6Mt/yr (I).
- 31. CEISA, San Bartolomé de Tirajana, Gran Canaria, 1.5Mt/yr (G).
- 32. Cementos Occidentals, Noblejas, Castilla-La Mancha, 0.7Mt/yr (G).
- 33. Cementos Occidentals, Nárón, Galicia, 0.7Mt/yr (G).
- 34. Cementos Lemona (CRH), Basque Country, 1.3Mt/yr (I).
- 35. Cementos Barrero, Andalusia, 1.0Mt/yr (G).
- 36. Cementos La Cruz, Abanilla, Murcia, 1.0Mt/yr (G).
- 37. Cementval, Puerto Sagunto, Valencia, 1.0Mt/yr (G) (W).
- 38. Ciments Terra Firma, Les Borges Blancs, Catalonia, 1.0Mt/yr (G).
- 39. InterCement Canarias, Tenerife, 0.8Mt/yr (G).
- 40. Ceminter Hispania, Jerez de la Frontera, Andalusia, 0.8Mt/yr (G).
- 41. Çimsa España, Buñol, Valencia, 0.7Mt/yr (I) / (W).
- 42. Cenves, Granadilla, Tenerife, 0.6Mt/yr (G).
- 43. Cementos El Molino, Santa Eulalia, Aragon, 0.5Mt/yr (G).
- 44. Cementos La Parrilla, La Parrilla, Castile y León, 0.5Mt/yr (G).
- 45. Cementos La Union, Ribarroja del Turia, Valencia (G).
- 46. Élite Cementos, Grau de Caselló, Valencia (G).



largest producer in Spain (10.2Mt/yr). Other local producers include Cementos Molins, Cementos Balboa and SA Tudela Veguín.

Recent news

In November 2020 LafargeHolcim España signed an agreement with Carbon Clean, ECCO2 for the installation of a carbon capture unit at its Carboneras plant in Almería. The installation will start to capture 10% of emissions in 2022, with the potential to eventually capture 100% (0.7Mt/yr) of CO₂. The producer will supply the CO₂ to gas systems specialist Sistemas de Calor for use in agricultural greenhouses.

In December 2020 Votorantim subsidiary Cementos Cosmos announced that it would build a 6.2MW solar plant for its Toral de los Vados plant in Castile y León, in partnership with France's EDF. The 14,000 panel array is due for completion in mid-2021. The company earlier announced that it had reached an alternative fuel substitution rate of 25% at its Oural plant in Galicia, the main component of which was olive stones.

In January 2021 Cementos Molins said it had dismantled three long disused kilns at its Sant Vicenç dels Horts plant in Catalonia. 48,000t of waste material, 35,000t of concrete, 10,000t of metal, 1450t of refractory material and 1500t of other waste, will be used in cement production at the plant.

Future

In December 2020 the Oficemen announced that it intended to reduce the Spanish cement sector's CO₂ emissions by 43% by 2030 across its entire value chain compared to 1990 levels. This represents a significant tightening of its previous target of 27% by 2030. Oficemen intends to meet the tougher reduction by using the so-called 5C approach - clinker, cement, concrete, construction and built environment, and (re)carbonation – as detailed by CEMBUREAU, the European Cement Association. Increased sustainability investments will follow, especially if the price of CO₂ emissions credits continues to rise due to the EU Emissions Trading Scheme (Euro33.99/t on 11 January 2021). Along with sustained low demand for cement at home and increased self-sufficiency in the country's former export markets, we can anticipate significant plant closures in Spain's cement sector over the course of the 2020s. 

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Argentina: Holcim Argentina's Yocsina grinding plant to close in March 2021

Holcim Argentina has confirmed that it will stop milling activity at its Yocsina cement grinding plant in Córdoba province at the end of March 2021. The decision is part of a move to unify all cement grinding in the region at its integrated Malagueño plant, according to Agência CMA. The latter unit is currently being upgraded with start-up scheduled for the first quarter of 2021.

Paraguay: Cementos Concepción's Concepción cement plant scheduled for commissioning from June 2022

Cementos Concepción (Cecon) says that its new 1Mt/yr integrated Concepción cement plant in San Lazaro will start commissioning in June 2022. Regular production is expected to start in August 2022. The Hoy newspaper reports that the project recently secured its last phase of funding. It has a total investment of US\$240m.



Brazil: 2020 cement sales rise by 11%

Brazilian cement producers sold 60Mt of cement in 2020, up by 11% year-on-year. The Valor Econômico newspaper has reported that residential and commercial renovations and new projects contributed to the increase. The National Cement Industry Association (SNIC) has forecast that growth will not exceed 1% in 2021, due to an economic downturn and the end of the government's emergency aid programme.

Dominican Republic: Estimated 8% cement production drop in 2020

The Dominican Association of Portland Cement Producers (ADOCEM) estimates that local production fell by 8% year-on-year in 2020 due to the coronavirus pandemic. Julissa Báez, the executive director of ADOCEM, said this compared to a 16% drop in the construction industry generally, according to local media. She added that cement plants were allowed to continue production during a local lockdown that started in March 2020.

Mexico: Arrest warrants issued for Cooperativa La Cruz Azul infiltrators

Police have issued arrest warrants for three leaders of an alleged criminal network which stole 10,000t of cement from Cooperativa La Cruz Azul. The El Universal newspaper has reported that the accused stole the cement by running a parallel accounting system from within the company. They sold the stolen cement via the company Azul Concretos y Premezclados.

US: HeidelbergCement considering sale of Californian assets

HeidelbergCement is considering selling assets in California. Bloomberg News reports that it is working with Morgan Stanley on a potential divestment and it hopes to raise around US\$1.5bn. It is reportedly approaching competitors, including Martin Marietta Materials, Cemex, CRH, Summit Materials and LafargeHolcim, as well as companies in China and Latin America. The first bids are expected in early 2021.

The Germany-based building materials company operates three integrated cement plants in California, as part of its Lehigh Hanson subsidiary, in addition to

concrete and aggregates units. Divestment of these assets would focus the company instead on markets in the East Coast, Midwest and Canadian regions of North America.

In July 2020 HeidelbergCement announced that it had reduced the value of its assets by Euro3.4bn following a review. It blamed this on reduced demand for building materials due to the coronavirus pandemic and the devaluation of its Hanson subsidiary in the UK, in part related to the UK's exit from the European Union.

Brazil: Votorantim Cimentos establishes new distribution centre

Votorantim Cimentos has built a new distribution centre in Campos Novos, Santa Catarina. The facility will supply a 'complete portfolio for the civil construction market' in Santa Catarina, Paraná and Rio Grande do Sul. It will receive goods from six cement and building materials plants in the company's South Brazil region.

Regional commercial general manager Tony Noritake said "We invested in this distribution centre to better meet customer demand in the South, expand our presence and optimise costs."

Trinidad and Tobago: One-month closure for Rock Hard Cement

Rock Hard Cement closed during January 2021 in Trinidad due to alleged changes in government tariffs on imported cement. It hoped to reopen in February 2021 at the time of going to press. The company has published advertisements in local media warning of potential price rises of up to 80% in 2021. As well as changes to import costs the cement importer claims that the quantity of imported cement will be restricted to 75,000t/yr. The Ministry of Trade and Industry said it couldn't comment on the matter as it is currently undergoing legal proceedings.



Mexico: Cementos Moctezuma invests in solar power plant

Cementos Moctezuma is installing a 10MW solar power plant at its San Luis Potosí cement plant. Forbes Mexico has reported the estimated cost of the project as US\$10m. It will consist of between 32,000 and 33,000 panels.

The company said "The energy generated will be used at the Cerritos de Cementos Moctezuma plant, in order to replace a percentage of the electricity purchased from the Federal Electricity Commission (CFE), which is produced with fossil fuels and emits greenhouse gases." It added that it aims to generate economic savings in the medium term as well as following its sustainability policies.


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US: LafargeHolcim diversifies with Firestone Building Products acquisition

LafargeHolcim has signed an agreement to buy Firestone Building Products from Bridgestone Americas for US\$3.4bn. The company said that the new subsidiary recorded estimated net sales of US\$1.8bn and earnings before interest, taxation, depreciation and amortisation (EBITDA) of US\$270m. The group will finance the deal through cash and debt. It said that the acquisition is a milestone in its transformation to become the 'global leader in innovative and sustainable building solutions.'

Chief Executive Officer Jan Jenisch said "I am excited to be entering the highly attractive roofing business. With Firestone Building Products we are strengthening our biggest market, the US, while also building a global growth and innovation platform for the company. Today's milestone is a strategic leap on our journey to become the global leader in innovative and sustainable building solutions to build a world that works for people and the planet. I have great respect for the high-calibre leadership and expertise of the Firestone Building Products' team and look forward to welcoming them into the LafargeHolcim family."

Barbados: Death at Arawak Cement cement plant

A worker died following an accident at Arawak Cement plant in St Lucy on 28 December 2020. Two employees suffered burns whilst they attempted to fix a blockage at the unit, according to the Caribbean News Agency (CANA). An investigation into the incident is ongoing.

US: Energy Star for CalPortland's Rillito cement plant

The Environmental Protection Agency (EPA) has awarded CalPortland's Rillito cement plant in Arizona with its ninth consecutive Energy Star. Efforts towards energy intensity reduction at the plant included: replacing two preheater tower cyclones, installing 11km of new belting to a quarry belt conveyor, replacing the kiln baghouse fan and dust collector bags, increasing the plant's focus on energy efficiency by expanding its energy team, conducting more frequent energy meetings and communicating energy efficiency best practices throughout the plant.

President and chief executive officer Allen Hamblen said "CalPortland is pleased to accept the EPA's Energy Star 2020 certification in recognition of our energy efficiency efforts at the Rillito plant. We continue to demonstrate our commitment to environmental stewardship and Energy Star while also reducing our energy costs through the hard work of our employees and our corporate energy management culture."



Colombia: Cemex increases Cemex Latam Holding stake to 93%

Mexico-based Cemex has increased its stake in subsidiary Cemex Latam Holdings to 93% from 73%. Citigroup Global Markets acted as advisor and Corredores Davivienda acted as intermediary broker for the offer.

The group said "Through the offer, Cemex is simplifying and strengthening its overall capital structure by further consolidating its indirect interest in CLH."

Mexico: Cemex mends Puebla roads

Cemex Mexico has signed an agreement with the state government of Puebla for the repair of 5km of road near Tepeaca. The El Sol de Mexico newspaper has reported that under the agreement Cemex will supply hydraulic concrete for the works. The company plans to first repair a 3km stretch of the road, then complete the remaining 2km in 2022.

In 2019 and 2020 the company invested US\$3.5m in social projects in Puebla State. It repaired 4.5km of roads and donated 160t of concrete.

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Vietnam: VICEM launches 2021 production target

The Vietnam National Cement Corporation (VICEM) aims to increase cement production by 1% year-on-year to 22Mt in 2021. The Viet Nam News newspaper has reported that the company is targeting a sales increase of 7% to US\$1.5bn and a profit increase of 13% to US\$99m. The company says that it expects domestic cement consumption to rise by 5% to 30Mt.

The group has set out six solutions by which to achieve its goals: continue to 'optimise and improve production capacity' through promoting research and application of advanced science and technology, focus on 'investment in depth', reduce consumption, use resources economically and reduce environmental impacts throughout the supply chain.

VICEM chair Bui Hong Minh said, "Implementing the comprehensive restructuring project of the corporation in the period of 2019 - 2025 approved by the Ministry of Construction, VICEM is focusing on promoting innovation and creativity to bring new development space and motivation to the Bim Son Cement unit in particular and the cement industry in general."

In 2020 VICEM increased its full-year profit by US\$30m.

Vietnam: End of export growth and rise in domestic demand forecast

Vietnamese cement export growth is forecast to slow in 2021. The Viet Nam News newspaper has reported on research by SSI Research that expected exports to remain stable due to high infrastructure spending in China, but that growth is unlikely due to the full recovery of Chinese domestic cement supply in 2020. SSI Research forecasts a total 2021 cement and clinker sales growth of 2% year-on-year to 104Mt from 102Mt. It predicts a 5% - 7% increase in domestic sales. The country's installed cement production capacity is due to rise by 7% or 7Mt in early 2021.

China: Huaxin Cement launches new 2.9Mt/yr cement plant in Hubei Province

Huaxin Cement has ignited the kiln and started production at a new integrated 2.9Mt/yr cement plant near Huangshi City in Hubei Province. The company said that the plant will combine second-generation intelligent dry kilns, alternative fuel co-processing and a waste heat recovery power plant, at a total investment cost of around US\$465m. The group expressed its commitment to digital innovation and the promotion of Internet and industry. An artificial sand and gravel unit has also been started at the same site.



India: Odisha government approves Shiva Cement's expansion plans

The government of India has granted licences to JSW Cement subsidiary Shiva Cement for the expansion of its cement plants in the state. The New Indian Express newspaper has reported that the company has received approval for an integrated capacity expansion of 1.1Mt/yr and a clinker capacity expansion of 1.3Mt/yr.

The state government approved a total of US\$730m-worth of planned investments in various industries on 6 January 2020.

Philippines: Tariff Commission challenges cement duty rise

The Tariff Commission (TC) has said that it was unaware of a Department of Trade and Industry (DTI) order imposing higher-than-scheduled duties on imports of cement. The Manila Bulletin newspaper has reported that TC commissioner Ernesto Albano said that it was legally 'impossible' for rates to rise above the previously scheduled US\$0.19/bag. The DTI order in December 2020 set a duty of US\$0.20/bag in the second year of the three-year tariff scheme. Albano said, "The DTI cannot do that. The schedule has been set." He added, "The industry should improve so the duty should go down."



Pakistan: Six-month dispatches and exports rise

Cement dispatches in the first half of the 2021 financial year were 29Mt, up by 16% year-on-year from 25Mt in the first half of the 2020 financial year. The Pakistan Observer has reported that the All Pakistan Cement Manufacturing Association (APCMA) recorded an 11% year-on-year rise in December 2020 dispatches to 4.8Mt from 4.3Mt. Exports for the half were 5.0Mt, up by 15% from 4.4Mt.



Kazakhstan: Steppe Cement updates on 2020

Steppe Cement increased its full-year sales by 1% year-on-year to US\$73m in 2020 from US\$72m in 2019. Its cement sales fell by 4% to 1.6Mt from 1.7Mt, and its exports rose by 30% to 0.2Mt. Domestic demand rose by 6% to 9.4Mt from 8.9Mt. Steppe Cement's market share fell to 15%.

Kazakhstan's overall cement exports rose by 25% in 2020 to 2.0Mt from 1.6Mt. Imports fell by 14% to 0.6Mt from 0.7Mt.



India: ACC begins cement production at new 4.4Mt/yr Sindri grinding plant

LafargeHolcim subsidiary ACC has commissioned a new 1.4Mt/yr unit at its Sindri cement grinding plant in Jharkhand. The plant now commands a total grinding capacity of 4.4Mt/yr. The company began work on the expansion in December 2019 in order to strengthen its presence in the Eastern region. It said that the state government and local authorities aided smooth commissioning.

LafargeHolcim India chief executive officer and non-executive director ACC Limited Neeraj Akhoury said, "Strong ambition aimed at deliverance of high performance is what guided ACC to establish the commissioning of the Sindri GU-Phase-II within a record period." He added, "I am proud of the flexibility and agility demonstrated by the team."

ACC managing director and chief executive officer Sridhar Balakrishnan said, "The commitment, meticulous planning and collaborative approach by the Project Sindri team in these unprecedented times and commencing the cement production in a record time have set a new benchmark for ACC."

India: Dalmia Cement (Bharat) to upgrade Bengal Cement Works cement plant

Dalmia Cement (Bharat), plans to spend around US\$50m on a 2.3Mt/yr upgrade to its Bengal Cement Works plant in West Midnapore. The project will increase the unit's production capacity to 4Mt/yr. The company says that it will make the cement plant the biggest in the state of West Bengal. It intends to take advantage of expected growth in cement demand, following the coronavirus-related slowdown, due to affordable housing schemes, real estate and infrastructure projects.

"We have deployed the latest machinery and technology for this addition and will be producing only 100% blended cement so as to ensure reduced carbon footprint as part of our commitment to become carbon negative by 2040," said Ujjwal Batria, chief operating officer of Dalmia Cement (Bharat).

China: 11-month production rises

Companies increased total cement production in the first 11 months of 2020 by 1% year-on-year to 2.16Bnt from 2.14Bnt in the first 11 months of 2019. Xinhua News Agency has reported that estimated total building materials sector operating revenues rose by 1% to US\$700bn. The sector's estimated profit for the period rose by 3% to US\$61.9bn.

China: Production capacity reduction rules tighten

The Ministry of Industry and Information Technology (MIIT) has released tougher draft rules regulating how cement producers should decommission old production capacity before they build new capacity. Under the new guidelines, cement companies must retire

at least two tonnes of outdated capacity for each tonne of proposed new capacity in areas classified as environmentally sensitive, according to Caixin Global. Previously, the ratio was 1.5:1. In non-environmentally sensitive areas, at least 1.5 tonnes of obsolete capacity should be retired for every tonne of new capacity, an increase from the current ratio of 1.25:1.

The proposed rules are currently open for public comment. However, cement companies are reportedly hurrying to obtain approval for new capacity projects approved under the current, easier regulations. The Chinese Cement Association (CCA) has commented that some of the newly proposed projects 'challenge' the effectiveness of the government's intent with the new measures and it has recommended a ban on production swaps across regions. The new rules also include a clause intended to restrict the use of so-called 'zombie' capacity in the swapping process by limiting eligibility to production lines that have been operated for two or more consecutive years since 2013. Such redundant capacity is reportedly mainly concentrated in northeast China, Inner Mongolia and Xinjiang. No date for the ratification of the new rules has been disclosed.



Pakistan: Government extends fixed tax regime for construction industry

The government has extended its construction industry fixed tax regime by a further year until 31 December 2021. In a live address to the country, Prime Minister Imran Khan said that the move was in response to 'big' demand from the sector, according to the Dawn newspaper. Other incentives unveiled during the broadcast included an exemption for builders from disclosing sources of income to tax authorities until 30 June 2021. The measures follow the government's introduction of the foreclosure law, under which banks are aiming to allocate US\$2.36bn towards house building until 31 December 2021. Khan called 2021 a 'year of growth.'

Bangladesh: BCMA lobbies Bangladesh Bank for loan extension

The Bangladesh Cement Manufacturers Association (BCMA) has called on the state-owned Bangladesh Bank (BB) to extend an ongoing moratorium period on the payment of loan instalments by another six months to mid-2021 in response to the negative economic effects of the coronavirus pandemic. The original loan window was scheduled to end on 31 December 2020, according to the Dhaka Tribune newspaper. The association has also called for a fixed lending rate for non-government lenders due to rising costs. Local cement sales fell by 13% year-on-year in the five months from January to May 2020 due to a coronavirus-related lockdown that ended in late May 2020.



Nepal: Gopi Neupane appointed director general of Udayapur Cement

Udayapur Cement has appointed Gopi Neupane as its director general. He holds experience in the hydro-electric, health and education sectors, according to Khabarhub. The state-owned cement producer markets the 'Gaida Cement' brand.

India: Fives to supply classifier to Ramco Cements

France-based Fives says that Ramco Cements has ordered a second FCB TSV 5500 BF type classifier for raw material mixing at a plant in Tamil Nadu. The order follows the commissioning of a similar classifier from Fives at the same site. The upgrade is part of an overhaul of the unit's grinding equipment. No price for the order or commissioning date has been disclosed.

Indonesia: Semen Padang exports 1.6Mt of cement and clinker in 2020

Semen Indonesia subsidiary Semen Padang's cement and clinker exports totalled 1.6Mt in 2020. Indonesia Government News has reported that the company said that it exported 0.2Mt of cement and 1.4Mt of clinker throughout the year. The main markets for its products were Bangladesh, China, Malaysia, Myanmar, the Philippines, Australia, the Maldives and Sri Lanka.

Semen Indonesia group senior export sales manager Fift Abriyanto said, "There are two types of cement that we export, namely ordinary Portland cement (OPC) Type I grade 52.5N and OPC Type I grade 42.5N."

India: Producers accused of illegal mining

Meghalaya Cement, Star Cement and Amrit Cement have been accused of illegally mining 1.8Mt of limestone in Meghalaya between 2013 and 2018. The Northeast Now newspaper has reported that the companies mined the limestone in a tribal area of the state without environmental, forest or wildlife clearance or No Objection Certificates (NOCs). Local cement producers also allegedly owe the state government around US\$40m in related limestone mining licence fees. All three cement producers reportedly made donations to a local political party.

The state government is also investigating allegations that two of the cement producers have polluted two local rivers, Wah Lukha and Wah Lunar. The former river allegedly turned 'deep blue' due to pollution.

India: NCL Industries to establish two new ready-mix concrete plants

The board of directors of NCL Industries has approved plans for the establishment of two ready-mix plants at a cost of around US\$0.8m. The plants will be located in Hyderabad, Telangana and Visakhapatnam, Andhra Pradesh. Both projects are scheduled for completion in early 2021. The units will be financed by bank loan.

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SK Jain, Unithread, JK White Cement Works, Gotan

Improving decolouriser performance at JK White Cement's Gotan plant

JK White Cement reports on a number of improvements that led to increased mean time between failures and production rates at its cement plant in Gotan, Rajasthan, India.

The JK White Cement Works in Gotan is the first White Cement manufacturing factory in India to manufacture white cement using dry process technology. It was originally commissioned in 1984 with an initial production capacity of 50,000t/yr. It uses technology from FLSmidth, including its kiln, state-of-the-art continuous on-line quality monitoring and control by X-Ray analysis and PLC systems, which ensure the purest possible white cement.

Over the years, continuous process improvements and modifications have increased the plant's production capacity to 610,000t/yr, now at its lowest-ever energy levels.

Increased kiln breakdowns

The plant had experienced increased kiln section-breakdowns and could not achieve its targeted daily production volumes. Plant staff analysed breakdowns over a two year period. After preparing a Pareto Chart it was found that 80% of the issues are related to the reliability of the decolouriser.

The decolouriser at the Gotan plant is a rotary type cooler developed for high-quality white clinker (Figure 1). It has two main zones, the rapid cooling zone, and the drying zone. The rapid cooling zone occupies the inlet area of the decolouriser. It prevents the hot clinker from oxidising by rapidly cooling it with water jets at the inlet. The drying zone then follows from the end of the rapid cooling zone to the decolouriser outlet.

Problem solving

Several brainstorming sessions identified a number of issues:

1. The inlet chute of the decolouriser experienced frequent jams due to large lumps of clinker failing to pass through it. To circumvent this, the height of the inlet chute was increased by 90mm (Figure 2) and the throat area was expanded at the joint flange of the inlet chute (Figure 3). Two additional 20L air

Right - Figure 1: View of the decolouriser at JK White Cement's Gotan plant.



Far Right - Figure 2: Decolouriser inlet chute.



Far Right - Figure 3: Throat area.





Far Left - Figure 4:
New air cannons on the back of the inlet chute.



Left - Figure 5:
Damaged hood.

cannons were also installed in the back of the chute to remove material at regular intervals (Figure 4).

2. Damage to the decolouriser inlet chute led to a very short chute lifespan and caused further damage to the inlet casing attached to the shell, resulting in major breakdowns. This was due to refractory brick retainers and supporting flats becoming damaged by the hot material. To avoid this, the existing SS Flat 10mm refractory material was replaced with a supporting ring made of Grade 10 heat-resistant steel castings. This provided an immediate improvement to the lifespan of the chute. The plant also replaced the former low cement castable (FST) with a silicon carbide castable (MS 27) inside the decolouriser chute to increase its lifespan and prevent stoppages.

3. The outlet chute of the decolouriser also experienced frequent jamming, which was due to coating by clinker from the kiln. To alleviate this issue, the distance between the grizzly bars at the exit was increased from 150mm to 320mm. This has reduced the number of lumps that become blocked between the bars, something that had previously led the chute to choke. Since the changes, the outlet chute has only experienced one breakdown, which lasted about an hour.

4. The outlet hood of the decolouriser became damaged due to high system pressure (Figure 5). This was due to pressure build ups within the decolouriser circuit due to sequential blasts of its seven 70L air blasters. The damaged outlet hood was repaired, with plate thickness increased from 8mm to 10mm. Extra stiffeners were added to support the hood with respect to thermal expansion. During the annual kiln shutdown, the plant installed nine 20L blasters and one new 70L blaster to replace the seven 70L blasters. This reduced the total amount of air discharged during the sequential blasts throughout the decolouriser circuit. To date these measures have helped avoid further stoppages due to outlet hood damage.

5. The supply of water to the nozzle used for rapid cooling at the decolouriser inlet was occasionally interrupted. This was due to the bent position of the nozzle, enabling clinker to build up on its

surface and block its holes. The build up was exacerbated by the fact that the nozzle could not easily be removed from the casing for cleaning. After an unsuccessful retrofit where the size of the nozzle holes were enlarged, the nozzle itself was replaced. It was also placed on a new hanging support from a scraper inside the decolouriser to avoid bending the nozzle. Water spray nozzle stiffeners were also added to allow plant staff to pull the nozzle out smoothly.

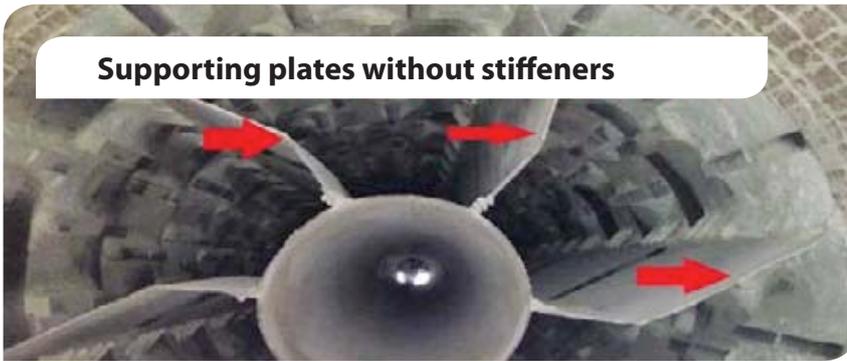
6. The scraper frequently became bent and damaged. This was due to the continuous water spray at the decolouriser inlet zone, which led to clinker coating and ring formation. This coating formation became hard over time and interrupted the scraper in a particular area. In the absence of a scraper support, the scraper was also liable to bending in the high-temperature environment.

The plant introduced tie bracings between the side pipes of the scraper to avoid bending. It also extended the scraper plate at the junction point of the U-shape pipe. The scraper plate was extended by 450mm x 700mm in the coating formation area. We have also modified the plain-end flanges to male-female machined flanges to prevent water leaking from the scraper.

7. The supporting plates in the decolouriser drying zone are welded between the decolouriser shell and the centre pipe, fastened at both ends by nuts and bolts and washers. However, some had become damaged by thermal deformation as hot clinker moves between the cooling and drying zones. Large coating lumps and pieces of refractory had also

Below - Figure 6:
Hanging support.





Supporting plates without stiffeners



Supporting plates with stiffeners

Above - Figure 7: Modifications to the supporting plates. Top image is before and lower image is after modifications.

damaged the plates due to their weight. To correct this, extra stiffeners were included along the width of the supporting plates to prevent thermal deformation (Figure 7). We also used flanged bolts and nuts, instead of bolts with washers.

8. Heavy material spilled from the decolouriser inlet seal. This was due to the fact that the scraper was installed up to 2.3m inside the decolouriser. After this length there was coating formation in a particular area inside the decolouriser. This coating formation caused heavy material spillage from the decolouriser inlet seal. This was corrected by extending the scraper plates to both sides in the reducer area. This modification also extended scraper life.

Below - Figure 8: Scraper plate extension.



Extended plate

9. The single inlet seal of the decolouriser had become damaged due to shell ovality and floating. The inlet seal ring was locked by a key mounted over the decolouriser inlet casing. During a recent shutdown, the key was removed to stop the relative motion between the decolouriser and seal ring. We have also welded an additional parallel ring with a 20mm gap, which has helped the inlet seal ring to stay in line while floating.

10. The supporting rollers and tyres had become worn due to the spillage of material from the decolouriser inlet seal. The clinker dust wore down the roller and tyres, forming a hilly profile (Figure 9).

To correct this, the plant installed two new rollers at the first support. The two worn rollers were rebuilt and used at the second support. We also increased the hardness of the supporting rollers from 170BHN to 230BHN. A supplier experienced in in-situ tyre grinding was brought in to correct the alignment for proper floating.

In addition, the plant added covers over all four supporting rollers to prevent dust ingress and maintains daily cleaning of all rollers and guards.

11. The decolouriser shell had become worn at the inlet end. This was due to material spillage coupled to the fact that removal of dust from under the decolouriser is difficult while it is in operation. Initially clinker dust was collected manually. However, the material still formed a heavy pile below the shell. It was so large that it reached the support of the second tyre, causing tyre and roller wear.

To circumvent this, we installed a seal hopper with screw conveyor (Figure 10) and chain conveyor to collect the spilled clinker dust from decolouriser inlet seal. Thanks to this installation, the spilled dust is fed to the clinker transport deep pan conveyor directly via a chute. This installation did away with the costs of staff manually removing the material, while dramatically improving safety and working conditions.

12. The mechanical thrust roller at the inlet pier was broken in three places after the supporting roller replacement was carried out at the outlet pier. This was due to setting the actual centre distance as per erection specification during the replacement of the supporting roller. This issue became increasingly critical, as we were not able to float the uphill side of the decolouriser. This led to the machine constantly running with



an extreme downhill tendency i.e., the downhill side thrust roller at the inlet pier was running with a high load.

Considering the high downhill tendency of the drum, it was decided to check the existing thrust on each of the supporting rollers. This is the most difficult type of bearing on which to perform a skew correction, as spherical roller bearings are not designed to accommodate any axial float.

We used the oil test and wipe test to work out the thrust of the roller bearings. Both methods found that the right side roller at the outlet pier and the left side roller at the inlet pier had a high tendency to push the decolouriser in the downhill direction. The other left hand side roller at the outlet pier was pushing the decolouriser in a slight uphill direction. There were some difficulties assessing the thrust on the right hand side roller at the inlet pier as it had a poor surface profile.

A full skew correction is not recommended unless all rolling surfaces are cylindrical. Also, the slope of all of the rollers should be within the desired slope. In order to achieve perfect axial balance of the drum, with proper up and down floating, the following tasks were performed:

- i. Correct inclination of support rollers;
- ii. Correct skewing of support rollers;
- iii. Ensure smooth cylindrical surfaces on all tyre and support rollers;
- iv. Lubrication between tyre and support rollers with dry graphite lubricant;
- v. Immediate in-situ grinding of all decolouriser tyres.

Beneficial impacts

After carrying out the above improvements, kiln reliability increased and we were able to increase the mean time between failures from 48hr to 415hr. Stoppages fell from 100/yr to 12/yr, a huge improvement in terms of kiln reliability and productivity. 🌐



Above Top - Figure 9:
Worn out roller.

Above Middle - Figure 10:
New drag chain conveyor.

Above Bottom - Figure 11:
New screw conveyor.



ANNUAL STOPPAGES

Left - Figure 12:
Increased MTBF (left) and reduced stoppages per year (right).



Contents

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Oman: Loan for Duqm plant build

Raysut Cement subsidiary Duqm Cement Factory has signed a deal with Ahlibank for a US\$21m loan for the construction of its Duqm grinding plant in Al Wusta Governorate. The grinding plant will produce ordinary Portland cement (OPC), Portland limestone cement (PLC) and ground granulated blast furnace slag (GGBFS), according to the Times of Oman newspaper. Construction of the plant started in November 2020.

Raysut Cement chief executive officer Joey Ghose said "We would like to extend our sincere gratitude and appreciation to Ahlibank for financing the Construction of Duqm Cement Factory's new grinding plant in Duqm Industrial Estate. Through strategic partnerships with the public and private sectors, the bank has ensured the all-round development of Oman's diverse sectors. The new cement plant will spur economic activities in around the Duqm Industrial Estate and thereby bring more and more businesses to the region."



Image: Port of Duqm, Oman, during construction.

Turkey: Cement exports raise US\$1bn in 2020

Exports of cement from Turkey raised nearly US\$1bn in revenue in 2020. Tamer Saka, the CEO of Turk Cement, said that the country exported 30Mt in 2020 making it the world's second largest cement exporter. He added that the local sector has a production capacity of 100Mt/yr. "The sector has been selling cement to important big projects in the US and they prefer Turkey because of both price and quality," said Saka.



Senegal: Big upgrade for Ciments du Sahel

Ciments du Sahel has begun work to increase the cement production capacity of its Kirene cement plant to 6Mt/yr. Agence de Presse Sénégalaise has reported that the installation of a third line at the company's 3.0Mt/yr plant will double the unit's capacity when opened before the end of 2023.

Chief executive officer Latfallah Layousse said "We are now at a production capacity of 3Mt/yr of cement. Currently, we are starting our third line with a doubling of our production capacity in the next three years. The doubling of our production capacity will allow us, in the long term, to rise to a higher level and become one of the largest cement factories in the region."

South Africa: Results rise at PPC

PPC recorded sales of US\$332m in the first half of its 2021 financial year, up by 1% from US\$328m in the first half of its 2020 financial year. Earnings before interest, taxation, depreciation and amortisation (EBITDA) rose by 15% to US\$66m from US\$58m. Cement volumes fell in South Africa by 5% and in Botswana by 10% due to a 35% slump in total volumes in the first quarter. The company said that this was due to muted cement sales in April 2020 and May 2020 as a result of Covid-19-related trading restrictions in South Africa. Cement sales have since recovered with strong year-on-year growth since June 2020. The increase in volumes is primarily retail-led. PPC also said that it is beginning to experience the positive impact of increased infrastructure spending.

PPC CEO Roland van Wijnen said "I am pleased that we are once again able to serve our customers and play our part in keeping the economy going. My gratitude goes to my colleagues who have been working diligently to keep our operations running while observing stringent health and safety protocols. Our business has benefitted from a strong recovery in cement sales in all our markets, post the easing of the lockdown restrictions, and this has resulted in improved financial performance for the group. Our efforts to improve cost competitiveness and reposition PPC on a sound financial footing are yielding encouraging results."



Saudi Arabia: Saudi cement sales rise 17% in November

Domestic cement sales in November 2020 were 4.8Mt, up by 17% year-on-year in November 2019. Mubasher News has reported that Saudi cement exports fell by 6% to 179,000t from 192,000t. Clinker exports rose by 85% to 490,000t. The national clinker inventory fell for a seventh consecutive month, to 38Mt. Saudi Arabia produced 5.0Mt of cement and 4.3Mt of clinker in November 2020.

Nigeria: Three Chinese plants for BUA

China-based Sinoma CBMI Construction has signed an agreement with BUA Cement to build three 3Mt/yr plants in Adamawa, Edo and Sokoto states respectively. When completed by the end of 2022, the projects will bring the producer's installed capacity to 20Mt/yr, according to the Vanguard newspaper.

The deal is Nigeria's largest ever single contract for the construction of cement plants, which will cost in excess of US\$1bn.

Nigeria: SON certificates for Lafarge Africa

The Standards Organisation of Nigeria (SON) has awarded Mandatory Conformity Assessment Programme product quality certificates to Lafarge Africa. The certificates were presented after the company's Mfamosing cement plant met confirmatory and standardisation requirements set by the SON.

The subsidiary of Switzerland-based LafargeHolcim said that the certifications further demonstrated its commitment to ensuring quality assurance and compliance with the relevant product standards within the regulatory framework of the government. The certification process followed a series of inspections and connected analysis.



Nigeria: Producers contribute to Mass Housing Programme

BUA Cement and Dangote have signed an agreement with the Nigerian government to supply cement at a discounted rate for the construction of 300,000 homes under the government's Mass Housing Programme.

Nigerian Vice President Yemi Osinbajo said that the producers have agreed to provide cement for this project at a 'considerable' discount, which he described as 'very helpful.' He added, "Also important is the job creation aspect of it. You have young men and women who are builders, architects and civil engineers working on this project. We are hoping that a lot of the other building materials will also be made locally."

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Egypt: ICSID rules against Cementos La Unión in compensation case

The US-based International Centre for Settlement of Investment Disputes (ICSID) has ruled in favour of the Egyptian government in a compensation case raised by Spain-based Cementos La Unión concerning its Arabian Cement Company (ACC) subsidiary. The El Economista newspaper has reported that the company sought US\$286m in compensation, due to the Egyptian government's decision to retroactively impose new activity and electricity licences shortly after ACC built a new integrated cement plant in Suez Governorate. Cementos La Unión argued that the additional licences breached a bilateral agreement between Spain and Egypt covering investments that were already in place.

The company said that it will continue to pursue its claim, which is also progressing in Egypt.



Oman: Seven employer awards for Raysut

Raysut Cement received a total of seven awards at the Oman Best Employer Brand Awards 2020 and the Gulf Cooperation Council Best Employer Brand Awards 2020. Group chief executive officer Joey Ghose won CEO of the Year at both the Oman and GCC awards. In the former, the company also won Best Use of Technology in the Workplace, Promoting Health in the Workplace and Training Provider of the Year. At the regional awards it won the Talent Management and Leaders of Tomorrow awards.

Acting deputy CEO Salim bin Ahmed bin Alawi Al Ibrahim said, "We operate beyond Oman - in the UAE through our subsidiary Pioneer Cement Company, in Yemen through associates and in East Africa through trading offices as well as new investments. We have also invested in Georgia and have recently acquired a terminal in the Maldives too. We will be expanding further and will be present in different parts of the world supporting infrastructure development in various geographies with Omani clinker and cement. In 2019 Raysut Cement acquired Sohar Cement and we believe that our success lies in our highly motivated, skilled and trained employees who deliver the best quality we are known for."



Rwanda: Cimerwa sales rise

Cimerwa's sales grew by 1% year-on-year in the 2020 financial year, in which it recorded earnings before interest, depreciation, taxation and amortisation (EBITDA) of US\$16.7m. The PPC subsidiary said that it recovered strongly from a 40-day shutdown of cement production due to a national coronavirus lockdown that started on 22 March 2020, with cement production of 55,000t in July 2020. It also diversified its product range during the period with the launch of its new Sure Range cements. Chief executive officer Albert Sige said "These results demonstrate Cimerwa's strong foundation, resilience and great potential. In response to the exceptional situation of the Covid-19 pandemic, the team stepped up to the challenge by putting in place measures to ensure business continuity and protect performance. As the market opened up, we were more than ready to continue supplying our customers."

Kenya: Judge reinstates sacked EAPCC production manager

A court in Nairobi has reinstated Jacob Omondi Guma as a production manager for the East African Portland Cement Company (EAPCC). It follows the company's decision to appoint Japheth Ombogo to the position, according to the Business Daily newspaper. The judge annulled the company's decision on the grounds that it was marked by irregularities and may have been 'malicious'. The court ruled that Guma may stay in post until his three-year contract ends in September 2022 unless otherwise lawfully terminated. He was removed from the role in November 2019 after serving for just two months. The cement producer denies the allegations and says it removed him from the post owing to a lack of qualifications.



These pages give *Global Cement Magazine's* monthly review of global cement prices - in US\$ for easy comparison. Some price information is only available to subscribers to *Global Cement Magazine*. Subscribe on Page 64. In this issue subscribers receive information from: Kazakhstan, Mali, China, Nigeria, Syria, Mexico and Ethiopia.

Prices are for metric tonnes unless otherwise stated. US\$ conversions from local currencies are correct at the time of original publication.

Egypt: Ordinary Portland Cement prices as at 20 January 2021: Arabian Cement Co (Al Mosalah) = US\$48.95/t; Arabian Cement Co (Al Nasr) = US\$47.04/t; Cemex (Al Nasr) = US\$47.04/t; Cemex (Al Fahd) = US\$45.33/t; Minya Portland Cement (Minya) = US\$45.96/t; El Nahda Cement (Al Sakhras) = US\$45.33/t; Wadi El Nile Cement = US\$46.41/t; Lafarge (Al Makhsous) = US\$46.41/t; Arish Cement (Alaskary) = US\$46.77/t; Sinai Cement (Sinai) = US\$46.97/t; Suez Cement (Al Suez) = US\$47.05/t; Helwan Cement (Helwan) = US\$47.05/t; Misr Beni Suef = US\$47.05/t; El Sewedy Cement = US\$48.32/t; Misr Cement Qena (Al Masalah) = US\$45.33/t; South Valley Cement (Ganoub Elwady) = US\$45.96/t; Al Watania Company for Cement in Beni Suef = US\$45.77/t.

White cement prices as at 20 January 2021: Sinai White Cement (Alabid Elnada) = US\$158.93/t; Sinai White Cement (Super Sinai) = US\$156.39/t; El Menya Cement (Super Royal) = US\$151.94/t; El Menya Cement (Royal Elada) = US\$154.48/t; Menya Helwan Cement (Alwaha Alabiad) = US\$154.16/t.

Blended cement prices as at 20 January 2021: Cemex (A.one) = US\$39.41/t; Sinai Cement (Al Nakheel) = US\$40.05/t; El Menya Cement (Al Omran) = US\$39.41/t; Helwan Cement (Al Waha) = US\$41.32/t; El Sewedy Cement (Sewedy Tashtibat) = US\$41.83/t.

Sulphate-resistant cement prices as at 20 January 2021: Arabian Cement Company (Moqwem Mosalah) = US\$50.22/t; Cemex (Al Mukawem) = US\$48.82/t; Minya Portland Cement (Asec Sea Water) = US\$47.36/t; Lafarge (Kaher Al Behar)

= US\$49.58/t; Suez Cement (Al Suez Sea Water) = US\$49.26/t; El Sewedy Cement (El Sewedy Al Mukawem) = US\$49.58/t; Al Watania Company for Cement in Beni Suef = US\$48.50/t.

EU ETS: CO₂ emissions permits cost Euro32.45/t on 18 January 2021, a 5.8% fall week-on-week from Euro34.43/t on 11 January 2021, a 4.8% month-on-month rise from Euro30.96/t on 18 December 2020 and a 28.0% rise year-on-year from Euro25.36/t on 17 January 2020.

The permit cost reached an all-time high of Euro34.82/t on 8 January 2021 and has not dipped below Euro30/t since 9 December 2020.

India: Cement prices across India fell in January 2021 despite an ongoing recovery in demand. Research from Kotak Institutional Equities showed that, on a pan-India basis, prices fell by around 2% month-on-month, around US\$0.12/bag (50kg). This took the all-India average price to US\$4.71/bag as at 17 January 2021.

"The price correction, ahead of pick up in construction activity, is unseasonal based on historic trends," said Kotak's 17 January 2021 report. "Historically, prices start inching up in January ahead of peak construction activity. In the past 20 years, January has witnessed price corrections in only four instances."

Prices in North and Central markets saw a moderate month-on-month price fall, partially due to extreme weather and disruption led by farmer protests. Prices declined by 5% month-on-month in the South, again due to adverse weather conditions led by cyclones and demand pushback from infrastructure projects due to high prices. Prices in the West fell by 2% and they fell by 2% in the East, where they hit a five-year low.



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The weird and wonderful world of English...

Peter Edwards Editor, *Global Cement Magazine* (peter.edwards@propubs.com)



One of the many facets of the recently-imposed *third* UK lockdown has been a return to home-schooling for my eldest daughter. She is now approaching six, which means a longer attention span and greater comprehension than in previous lockdowns. The school subjects have increased in depth and breadth to fit, meaning she is now knee-deep in something approaching proper maths, while other tasks prompt the investigation of materials (science) and discussion of whether things around us are natural or made by people (geography).

At the moment one subject takes up the most time: English. Together, we write sentences, practise spellings and learn new sounds. Thankfully, the school provides helpful videos to explain how the different sounds combine to form words. This approach, phonics, builds up a bank of sounds that are used to make words. It starts, innocuously enough, with m, a, s and d. Throw in some other friendly letters and you can build words like 'cat' and 'dog' with ease.

Then, things get more difficult. Should it be a 'kicking k' or 'curly c'? One 'm' or two? Why is it 'circle' and not 'sercul'. Follow the sound chart to its end and you will meet 114 letter combinations. Given that English has only 44 sounds, this seems excessive.

Look at the sentence 'I tie my kite up high.' There are five ways to spell the same 'i' sound. **Score, door, ore, raw** and **Audrey** all share the same vowel sound but look different. Then we come to the incredible 'ough,' which crops up in **cough, rough, through, bough** and **though**. Four letters, five different sounds. There is a reason we spend so much time teaching this ridiculous language!

English is a Western Germanic language. Its story starts with the Angles, who came to the British Isles from the European mainland in around 400 AD. Their dialect became widely spoken as what is now called Old English, before the arrival of the Normans in 1066.

The Normans introduced a wealth of Romance (Latin) vocabulary to English, leading to the development of Middle English. It is at this point that the irregular spellings started to creep in, as the Angles and Normans hadn't swapped notes on which letters made which sounds. We got duplicate spellings for the same sounds and different sounds for the same spellings. For example, the English 'circle' has the soft c because it came to England as the Old Norman 'cercle,' itself from the Latin 'circus' (ring).

The arrival of the Normans also explains why English seems to have too many words, more in fact than any other language. This is partly because, rather than replacing the older Germanic words, the French words were used in parallel. This was aided by the fact that only the high and mighty would use French, while the great unwashed stuck with what they knew. Most famously, this explains why a cow is a cow when it is raised by the poor old farmer, but transforms into beef (boeuf) by the time it is served at the nobleman's table.

Over time the languages mixed into the early Modern English of Shakespeare, but the duplication was retained. Today, you can *buy* something or *purchase* it, *want* something or *desire* it, *start* something or *commence* it, *eat* something or *consume* it. Then, just as the printing press was hitting its stride, English spontaneously embarked on a 'Great Vowel Shift,' changing the pronunciation of the long vowels. The result? A huge disconnect between the spellings of words that had become standardised by the press and how they were actually spoken. New words were then added on top of all this, creating a truly unique mish mash, indeed one you think would die a rapid death.

However, its spread via the British Empire and the rise of the United States in the 1800s and 1900s respectively meant that English did the exact opposite. In the 21st Century it is more varied than ever before, with at least 160 distinct dialects and thousands of accents to choose from, from Johannesburg to Jamaica, Glasgow to Gibraltar and Liverpool to Los Angeles. The unique use of both Romance and Germanic vocabulary in English allows speakers of these languages to rapidly gain a foothold, while (over)exposure and forgiving grammar (including the absence of gendered nouns) help others find a way in. Today, English remains the main language of international business, aviation and even the EU, despite the UK now having completed its Brexit.

However, despite its 1.2 billion speakers, English is the *first* language of only around 400 million. So, can it retain its position as the world's favourite language, or will it split into new ones? This appears to already be happening, with hybrid forms such as Hinglish in India, Spanglish in the US and Chinglish in China. Soon, these may become mutually unintelligible, i.e. different languages altogether. At this point, my daughter may find that she has to learn English all over again...this time as a foreign language! 🌐



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