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There seems to be some momentum building in the cement industry behind carbon capture. Last month, a consortium led by CarbonCure Technologies demonstrated the first integrated carbon capture and utilisation from cement and concrete production. The project involved capturing CO₂ from Argos USA’s Roberta cement plant and then transporting it for use at Argos USA’s Glenwood ready-mixed concrete plant in Atlanta, Georgia.

The project made good headlines; its value lies in the technology’s availability, its low set-up cost, scalability, and ability to deliver an extra revenue stream to the cement plant. In contrast, fully-integrated full-scale carbon capture solutions are not yet ready for widespread roll-out within the industry.

The industry needs to start carbon capture as soon as possible. According to a recent report by CDP, the cement industry in its current form “is not compatible with the commitment taken at COP21 in Paris and needs a significant change in business-as-usual practices to align to a two-degrees trajectory.” Of the companies surveyed by CDP, there was an average reduction in emissions intensity of 1% per annum over the last four years. This “would need to more than double to meet a two-degrees target.”

CarbonCure’s Technology demonstration is therefore welcome, as are the various carbon capture and storage/utilisation projects underway around the world (e.g. at Norcem’s Brevik cement plant, the LEILAC project, Taiwan Cement’s calcium-looping plant in Hualian, etc.). It is, however, not all about carbon capture. The Cement Sustainability Initiative (CSI) identifies four “carbon mitigation levers”: in addition to carbon capture and storage/utilisation, these are improving energy efficiency, switching to alternative fuels, and reducing the clinker-to-cement ratio. The CSI also acknowledges however that “existing technologies alone cannot reduce cement industry CO₂ emissions indefinitely. Further dissemination of state-of-the-art technologies […] is needed.”

Some cement companies are stepping up. According to CDM, which ranked 13 cement companies on their readiness for a low-carbon economy transition, Indian producers Dalmia Bharat and Ambuja Cement are leading the way, while Shree Cement comes in at four. Cementos Argos and LafargeHolcim also make it into the top five. Yet of the 11 carbon-emissions goals among these 13 companies, only three are sufficient to meet a two-degrees goal.

There is thus significant work ahead for the industry. Good-news stories – such as CarbonCure Technology’s success in the US – should spur researchers and companies on. There is also a key role to be played by governments and regulators in supporting technological development, while the industry as a whole needs to do more to change public perception of the industry. At the moment, cement plants are often met with local opposition when attempting to change their operating parameters to (for example) cofire alternative fuels. A better public image of the industry would allow for smoother approvals of such vital initiatives.

Here at World Cement, we will also continue to cover the development of cleaner cement technologies. So if you have an environmental project underway and would like to see it featured in the magazine, please do get in touch by email (jonathan.rowland@worldcement.com) or connect with us on social media. We are @World_Cement on Twitter; you can also find us on LinkedIn and Facebook. I hope you enjoy the issue!
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Global HeidelbergCement reports a record year in 2017

Cement major, HeidelbergCement, reported a record year in 2017, boosted by the integration of Italcementi into the results for the first full year. Revenue hit €17.3 billion, a 14% increase on the previous year, while earnings were also 14% higher at €3.1 billion.

Cement sales were 125.7 million t, a 22% increase on 2016. Sales of aggregates and ready-mixed concrete also showed double-digit growth. Asphalt sales were up 3%.

“2017 was an exceptional year for HeidelbergCement,” said Dr Bernd Scheifele. “In its history stretching back over 140 years, HeidelbergCement has never sold more cement, concrete, gravel, and sand than in 2017. New record figures were also achieved in revenue and result from current operations."

Despite the record headline figures, pro-forma figures – which strip out the impact of the Italcementi integration – were less spectacular. Revenue rose just 2% on a like-for-like basis, while earnings were up 6%.

Pro-forma cement, aggregates, and asphalt sales were up just 1%, while ready-mixed concrete sales were down 3%.

Looking forward, the company expects a positive 2018, predicting rises in sales volumes of cement, aggregates, and ready-mixed concrete. It is targeting a moderate increase in revenues, while seeing earning rise by a “mid to high-single digit percentage before exchange rate and consolidation effects.”

Global US underpins a steady year for Titan Group in 2017

The US market drove a steady year for Titan Group in 2017 with turnover level at €1.506 billion and earnings marginally down at €273.4 million. US turnover was €873.2 million, an increase of 9.9%, while US earnings were up 27.5% at €185.1 million.

“Demand for building materials [in the US] continued on its secular growth trend.” Titan said in a press release announcing its 2017 results. “Titan America was well placed to benefit from the improving markets on the back of an extensive investment programme of about €240 million.”

Undertaken over the last three years, this investment programme has “improved operational efficiency and expanded ready-mixed concrete, aggregates, and flyash activities.”

Elsewhere, results were mixed with the company’s operations in southeastern Europe, reporting a recovery in demand, albeit offset slightly by higher fuel costs. Building activity in Titan’s home market of Greece weakened further in 2017, while Titan’s Egyptian operations were hit by the devaluation of the Egyptian pound in late 2016.

Performance at the company’s joint ventures in Brazil and Turkey was also weaker. Demand in the Latin American giant continued its downward spiral in 2017, while greater competition in Turkey hit the company’s ability to take advantage of rising demand.

The headwinds in Greece and Egypt are likely to continue through 2018, the company added, with the US remaining the “main engine of growth and profitability”. There are also signs that Brazil may begin to recover this year with stronger economic growth anticipated.

Africa Dangote Cement reports strong results in 2017

Dangote Cement Plc has reported cement production of 21.2 million t across the group in 2017, a slight decrease on the previous year’s production of 22.5 million t. Revenues from the sale of cement were up, however, at NGN805.3 billion. Revenues from the sale of cement in 2016 were NGN614.9 billion.

The company had an installed cement production capacity of 43.550 million t in 2017, an increase of 1 million t on 2016. Capacity utilisation was 48.73% in 2017, compared to 52.95% in 2016.

Dangote’s Nigerian business accounted for around 68% of the company’s revenues in 2017, slightly down on the previous year. Its Pan-Africa revenues rose slightly from 31% of revenues in 2016 to 32% in 2017.

EBITDA for 2017 was NGN388.2 billion, compared to NGN257.2 billion in 2016, a 50.9% increase on the previous year. Nigeria remained the primary contributor to EBITDA, bringing in NGN360.8 billion of the company’s total earnings. Pan-Africa EBITDA was NGN38.3 billion.
Cementir Holding has completed its purchase of an additional 38.75% stake in Lehigh White Cement Co. The acquisition brings its holding in the company to 63.25%. The remaining 36.75% is owned by CEMEX Inc.

Cementir is paying a total of US$106.6 million in cash for the 38.75% stake in a deal that sees Lehigh Cement Co., a subsidiary of HeidelbergCement AG, exit the business.

“This acquisition gives us the opportunity to directly manage assets in the US in our core white cement business, reinforcing our global leadership and supporting our growth strategy,” said Francesco Caltagirone, Chairman and CEO of Cementir Holding, at the time the deal was announced.

Lehigh White Cement operates two white cement plants: one in Waco, Texas, and the other in York, Pennsylvania, with a production capacity of 0.255 million tpy.

Leading Chinese cement producer, Anhui Conch Cement Co. Ltd, reported investments in a range of environmental initiatives in its 2017 Social Responsibility Report, including a wet desulphurisation pilot project and carbon capture and utilisation research.

With an investment of CNY50 million, the company is constructing a carbon capture and purification demonstration project at Baimashan cement plant. The demonstration project is due to go into operation in 1H18. The project forms part of China’s commitment to reduce its carbon emissions under its Intended Nationally Determined Contributions agreed as part of the Paris Agreement. It also ties in with the company’s target of “turning waste into value”, Anhui Conch said.

The company also invested CNY40 million in a wet desulphurisation pilot project at subsidiary, Yangchun Chonch, in an effort to counteract the high sulfur content of the raw materials used at a number of its plants. The pilot project produces limestone slurry out of the kiln dust generated in the cement production process. The limestone slurry is then added to the kiln exhaust gas, after the gas enters the absorption tower, combining with the $SO_2$ to form a calcium sulphite. When dried, this material can then be used as a cement admixture, replacing gypsum, within the cement production process. This provides an “economic value” to the process, the company said, in addition to the environmental benefits.

“The group intends to implement the improvement of wet desulfurisation at other plants in 2018,” the company said. According to the company’s annual sustainability report, it emitted 15 900 t of $SO_2$ in 2017.

A third project involved the development of a low- and medium-temperature SCR technology to help further reduce the emissions of $NO_x$. The technology has been applied at the Baimashan plant for trial operation, which is expected to be completed in 2018. Anhui Conch already runs SNCR technology, as well as staged combustion and low-$NO_x$ combustion at all of its cement and clinker production lines. It emitted 135 800 t of $NO_x$ in 2017.

Overall, Anhui Conch reported investment of CNY700 million in energy conservation and environmental protection in 2017.
**KEY FIGURES**

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« What EML Group companies have been doing for 10 years »
Canada Judge allows Lafarge Canada to cofire tyres at Brookfield plant

A Judge in Nova Scotia, Canada, has rejected a bid to prevent the burning of whole tyres at Lafarge Canada’s Brookfield cement plant. The project had been approved by the provincial environment minister last year but opponents, including local residents, had launched a legal bid to reverse the decision.

The minister’s decision “easily passes muster”, wrote Justice James Chipman of the Nova Scotia Supreme Court. As a result, there was “no support” for overturning the project approval.

“We are pleased that we are now able to proceed with our one-year pilot demonstration and we believe that’s the best way to answer any remaining questions by all of our stakeholders,” a Lafarge Canada spokesperson told World Cement.

“This demonstration will allow us to confirm at full scale the excellent environmental results obtained in the Dalhousie laboratories. Based on the research and results available to us, we can expect a 30% reduction in greenhouse gas emissions for every tonne of coal replaced and a 15% reduction in NOx emissions.”

Germany A positive year but risks ahead for German building material plant suppliers

German manufacturers of building material plants – including cement – reported a rise in incoming orders in 2017 of 38%, according to the VDMA. Domestic orders were up 46%, while orders from outside of Germany were up 46% with the US the largest market for German equipment.

“We anticipate that incoming orders will once again grow in the double-digit range this year,” commented Hermann Weckenmann, Chairman of the Building Material Plants Group of the VDMA. Speaking at the recent Building Materials Plants Day in Frankfurt, Weckenmann forecast a significant demand increase from emerging countries and China.

Weckenmann also highlighted one of the key risks of 2018: the increase in protectionist economic policies in key markets. “We need free trade, because as small and medium-sized business, we cannot afford to build up production in every country in the world,” Weckenmann said. “We are dependent on exports!”

In addition to potential challenges to free trade, Chinese building materials plant suppliers will step up their challenge to western manufacturing companies both within China and globally, according to a presentation by Björn Conrad of Sinolytics. Speaking at the VDMA Building Materials Plant Day last month, Conrad argued that a combination of state support and higher technology standards will see Chinese companies bridge the gap with their western counterparts.

From 2021 – with the start of a new five-year plant – industrial policy in China will favour Chinese suppliers, pushing foreign manufacturers out of the market, Conrad said. Although opportunities will remain in specialisation and environmental technologies, western suppliers will need to prepare to this change.

In addition, the technological gap between Chinese and western manufacturers is narrowing, allowing Chinese companies to compete with larger international engineering companies on the global stage. Several state champions, such as merged Sinoma/LNBM and Pengfei, are leading the charge.

There will continue to be opportunities, however, particularly within the area of environmental protection, which are not yet the focus of political interest. Conrad also noted that China cannot currently cover the new demand for high-technology building plants locally, which will see demand for western technology continue at least in the short to medium term.

The VDMA Building Materials Plants Day is an annual event, bringing together suppliers to the cement, lime, gypsum, dry mortar, concrete, glass, and ceramics industries.

UAE ABB expands global network of drives remote service centres

ABB has launched its first remote service centre in Dubai, United Arab Emirates, for its energy-saving variable speed drives solutions. The remote service centre provides 24/7 access to information and support for predictive maintenance and condition monitoring of drives. The ABB Ability™ Condition Monitoring service helps anticipate possible operational issues and maintenance needs by monitoring real-time information, such as drives availability, environmental conditions, and fault events.
On the pulse

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IN BRIEF

FCT Combustion is expecting a record year with projects running on every continent except Antarctica and across a range of industries, including cement and lime. The company will also launch its latest burner this month. In Europe, the company’s projects include a burner upgrade at HeidelbergCement’s CBR Cimenteries in Antoing, Belgium, and Kerneos in Le Teil, France, where a new burner was installed for producing high-alumina clinker.

The Board of the LafargeHolcim Foundation for Sustainable Construction, as of 1 April 2018, will be chaired by former LafargeHolcim Executive Committee member Roland Köhler, replacing Rolf Soiron who acted as the Chairman of the Foundation since its inception in 2003.

Europe’s largest independent specialist producer of ground granulated blastfurnace slag (GGBFS), Ecocem, has rebranded across the group as it pushes into markets not traditionally served by GGBFS, including ready-mixed concrete, dry silo mortars, tile adhesives, screed, shotcrete, precast, roof tiles, piling, and soil stabilisation.

India’s Cement Manufacturer’s Association has reported cement production of 26.37 million tpy in February – an increase of around 23% on the same month in 2017. The higher production trend in February follows a similarly positive month in January, when production rose around 19.6% on January 2017, when the impact of the government’s sudden demonetisation in November 2016 was still hitting the industry.

Indonesia Gebr. Pfeiffer to supply three MVR mills

Gebr. Pfeiffer is to supply its first MVR mills to Indonesia. The package ordered incorporates two MVR 5000 C-4 mills for cement grinding and one MVR 5000 R-4 for raw material grinding. The mills will be set up at Grobogan cement plant located close to Semarang in central Java. The package also includes an MPS 3350 BK for grinding lignite.

The cement mills, each featuring a drive power of 4000 kW, will be capable of grinding 190 tph of ordinary portland cement at 3600 Blaine or pozzolana portland cement at 4000 Blaine. In addition, the mills will be suitable for grinding blastfurnace slag cements.

The MVR 5000 R-4, with a drive power of 4300 kW, is able to achieve a capacity of 500 tph of raw meal ground to a fineness of 12% R 90 µm. The lignite to be processed has a high feed moisture (37%), which is typical for Indonesia. The inherent moisture content in the lignite is 14%. The MPS 3350 BK with a drive power of 800 kW will dry the material to a surface moisture content of 1%, while at the same time grinding it at 50 tph to a fineness of 15 – 25% R 90 µm.

The order also includes a spare parts package for two-year operation. The essential modules of all three MVR mills will have the same design and therefore be interchangeable; the advantages in terms of spare parts management and maintenance of the mills will be significant.

The order was placed by the Chinese general contractor, Nanjing Kisen. Commissioning of the mills is scheduled for 1H19.

USA CalPortland is ENERGY STAR Partner of the Year

US cement producer, CalPortland, has been awarded the 2018 ENERGY STAR Partner of the Year Sustained Excellence Award. It is the fourteenth consecutive year the company has received such recognition from the US Environmental Protection Agency, a first within the US building materials industry.

The company’s energy usage fell by 16% in 2017 compared to a 2003 baseline, resulting in cumulative savings of US$109 million. CalPortland has also sought to promote energy management within the US cement industry through CEO Allen Hamblen’s role as Chairman of the Portland Cement Association, as well as offering the company’s expertise to others in the industry.

Two of CalPortland’s cement plants have also received ENERGY STAR certification, indicating energy performance in the top 25% of US cement plants. This includes the Oro Grande plant in California, which was acquired from Martin Marietta in 2015. This plant “required extensive upgrades and energy improvements to qualify [for ENERGY STAR certification] in less than two years,” the company said.

The company’s investment in energy management has included new plant hardware, including a high-efficiency mill separator, new equipment to improve the efficiency of raw feed processing, and computational fluid dynamic software to better manage process air and material flows.
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India Wonder Cement orders two more Pfeiffer mills

Indian cement producer, Wonder Cement, has ordered two vertical mills from Gebr. Pfeiffer, bringing the total number of Pfeiffer mills in operation at Wonder Cement’s plant to seven. The new mills will be used to grind cement and solid fuels.

A MVR 6000 C-6 will be supplied for grinding mixed cements to fineness degrees of up to 5% R 45 μm. With total drive power of 5820 kW, the new mill is identical to the MVR 6000 C-4 currently being assembled for Wonder Cement in Nardana in the state of Maharashtra.

The MVR 6000 C-4 will be designed to allow the grinding of granulated blastfurnace slag (GBFS) to a target fineness of approximately 4500 cm²/g according to Blaine, as well as slag cements with different proportions of GBFS, flyash, and gypsum, and with different product finenesses.

The new mill is also able to dry moist feed materials during grinding: a key feature given the trend in India to use stored flyash as an extender in cement. As the flyash has been stored outside, it has a very high moisture content and would have to be dried before grinding in other milling systems.

The mill is also able to grind relatively hot clinker, while reducing the temperature of the cement, as well as cold clinker from stockpiles.

Core components – including the tension system and the grinding rollers – will be supplied by Gebr. Pfeiffer in Germany, as will the grinding bowl and gearboxes for the mill and classifier. Gebr. Pfeiffer (India) Pvt Ltd, will supply the housing, foundations, and support for the rollers, as well as almost the entire SLS 5600 BC classifier.

Gebr. Pfeiffer (India) Pvt Ltd will also supply the equipment to complete the grinding plant, including the plant fan. Delivery is scheduled for early 2019.

In addition to the MVR 6000 C-4, Gebr. Pfeiffer is supplying an MPS 3070 BK mill for solid fuel grinding to support the expansion of Wonder Cement’s plant in Tehsil Nimbahera, where a third rotary kiln with a capacity of 8000 tpd is being installed. The new kiln will use petcoke and coal as fuel.

Petcoke will be ground to a fineness of 2% R 90 μm in the new MPS 3070 BK mill. The mill will also be equipped with an SLS BK high-efficiency classifier, allowing both coal and petcoke to be ground in the mill, dried with process gases, and then classified in the integrated classifier. Due to the high abrasiveness of Indian coal, the mill will include appropriate wear protection.

Most components of the coal mill will be supplied by Gebr. Pfeiffer (India) Pvt Ltd. The housing and foundation parts, the grinding bowl and a large part of the power-transmitting parts will be manufactured in India.

Commissioning of the entire kiln line with the new grinding plant is slated for spring 2019.

Global LafargeHolcim treats 10 million t of waste in 2017

LafargeHolcim’s global waste management business, Geocycle, treated 10 million t of waste in 2017, an increase of 13% on 2016. 10 million t is almost twice the total yearly household waste generation of Switzerland or the equivalent of 2 million garbage collection trucks.

The company coprocessed all types of waste, including solid shredded waste from industrial and municipal origin, spent solvents, used tyres, waste oils, contaminated soils, industrial and sewage sludges, as well as demolition waste.

“Sustainable building and living are key to the future and we are committed to playing an important role, as the demand for sustainable construction solutions and sustainable buildings and infrastructure continues to grow,” said Jan Jenisch, Group Chief Executive Officer. “We offer solutions that facilitate the simultaneous recycling and recovery of waste. We have ambitious plans to continue investing in all parts of the world in order to bring the most advanced technology and solutions to our partners and play a role in solving the global waste problem.”

In Europe and North America, the main growth area for LafargeHolcim’s global waste management business was industrial waste, while in Africa more biomass waste, such as rice and coffee husks, were treated. The strongest growth rates for municipal solid waste (MSW) were seen in Asia and Latin America, where waste infrastructures are still developing and municipalities continue to seek more sustainable solutions for the growing volume of household waste.

In 2017 LafargeHolcim built three new major waste treatment facilities: Kujawy in Poland, El Sokhna in Egypt, and Oum Azza in Morocco. Oum Azza is the first waste preprocessing platform for MSW in the Middle East and Africa and was developed by Geocycle using its proprietary technology. All of these plants will help to divert solid waste from landfill and uncontrolled dumping, reducing pollution of land and oceans.
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Contact: fivesfcb@fivesgroup.com
A New Wave of Terminals

Ad Ligthart and Marcia Ligthart, Cement Distribution Consultants, discuss the past and the future developments of US cement terminals.

Introduction
Seaborne cement imports in the US in 2017 totalled 9.8 million t. This is a substantially higher volume than the 3 million t of seaborne imports in 2010 at the height of the trade crisis. However, the 2017 volume is still far below the peak seaborne imports before the crisis, which exceeded 30 million t in 2006. During the crisis, many US cement import terminals were mothballed or used for domestic distribution. Reopening these terminals would be more than sufficient to handle current and coming import flows, yet more than 16 terminal expansion and newbuilding projects are underway or planned in the US and Canada. Why is this the case?

The US cement market
To get a good perspective on the US import situation, it is important to understand the US cement market. For this purpose, Cement Distribution Consultants developed a map, based on the USGS statistics, that shows the cement shortage and surplus situation by state, the location of the cement plants, and the import and export flows (Figure 1). States that have a higher cement production than cement consumption are shown in grey. States that have a higher consumption than production rate are shown in blue. The US has been divided into eight regions.

Northwest region
In the Northwest region, all four states have a cement shortage and the overall shortage for the region is about 1.7 million t meaning the region is a large seaborne importer. About 1 million t is imported from Canada via the Lehigh (Heidelberg) and LafargeHolcim terminal networks that receive their cement from self-discharging vessels. There are two major cement importers from Asia: Ashgrove (now CRH) and CalPortland. (Taiheiyo). The total volume imported from Asia was about 1 million t. About 300 000 t was moved from the Northwest region to the Southwest.

Southwest region
The Southwest region had a surplus for most of the crisis years and all its import facilities were mothballed. In 2015, the first facility in North California reopened and in 2016 and 2017 imports reached about 700 000 t. The cement supply situation in the Southwest is dominated by the cement plants in South California, which not only ensures the cement surplus in that state but also supply by rail to Nevada, Utah, and Arizona. Currently, the shortage situation in these three states is such that they absorb not only 400 000 t from the Northwest and North-Central regions, but also so much from South California that these plants cannot fully supply North California anymore causing the current import demand. It can be expected that the cement demand in Nevada, Utah, and Arizona will continue to grow, causing a restart of South California imports. The major import players in the Southwest region are Lehigh, CalPortland, and CEMEX.

North-Central region
The North-Central region has a surplus of about 1 million t and in addition receives 260 000 t from Canada by rail. This surplus by rail and trucks is distributed to the Great Lakes region (around 600 000 t) and to the Southwest and South-Central regions.

South-Central region
The South-Central region is dominated by Texas. This state consumes so much cement that it has a shortage of about 3.4 million t by itself and, although other states in the region have some surplus, the overall shortage in the South-Central region is about 3 million t. This shortage is partly alleviated by domestic transfers by rail from the Northwest (500 000 t), and by barge from Missouri via...
The biggest cement flow into the region is by waterway (total 700,000 t), and the Atlantic North region is supplied by rail and trucks from the Northcentral (Votorantim), and CRH. Apart from Great Lakes trade, the Big Rivers system includes the state of Missouri, a strong, resilient cement manufacturing state. A need for seaborne imports of 2.1 million t. New York City, Providence, and Philadelphia are the key terminal locations with Lehigh (Heidelberg), LafargeHolcim, and Titan being the biggest players, although independents also play a role. Lehigh and LafargeHolcim have extensive domestic distribution systems, with terminals receiving cement and slags from self-discharging vessels. Dragon Cement also has a small coastal distribution network.

Great Lakes region
The Great Lakes region has the largest overall cement shortage of 5.1 million t. Almost 1.9 million t of cement and clinker is imported from Canada, almost entirely by self-discharging vessels via a network of terminals and grinding plants. About 500,000 million t is exported to Canada. The trade across the Great Lakes is dominated by LafargeHolcim, Essroc (Heidelberg), St. Marys (Votorantim), and CRH. Apart from Great Lakes trade, the region is supplied by rail and trucks from the Northcentral region (700,000 t), and the Atlantic North region (400,000 t). The biggest cement flow into the region is by barge from the Big Rivers region (3.3 million t).

Big Rivers system
The Big Rivers system includes the state of Missouri, a scarcity in the US domestic cement distribution, with its surplus production capacity of 6.8 million t and its ability to distribute this cement along the Big Rivers over an enormous area. Apart from shipping 3.3 million t to the

Great Lakes region, it was also able to supply all states along the river system with a shortage – and even supplied Texas with 400,000 t in 2016. In 2017, this started to change and now the Great Lakes region consumes more cement from Missouri and, as a result, the first cement imports into Mississippi will start in 2018. This should strongly increase in the coming years (before the crisis in 2006 about 4.5 million t of cement was imported via the Big Rivers system).

The Atlantic North region
The Atlantic North region also has a substantial shortage of about 3 million t and, from its east border, about 400,000 t is distributed into the Great Lakes region. This creates a total import requirement of 3.4 million t of which 1.3 million t is imported from Canada via the Great Lakes and by rail. This means that the region has a need for seaborne imports of 2.1 million t. New York City, Providence, and Philadelphia are the key terminal locations with Lehigh (Heidelberg), LafargeHolcim, and Titan being the biggest players, although independents also play a role. Lehigh and LafargeHolcim have extensive domestic coastal distribution systems, with terminals receiving cement and slags from self-discharging vessels. Dragon Cement also has a small coastal distribution network.

The Atlantic South region
The Atlantic South region has only recently started to import more substantial volumes. It has an overall cement shortage of about 250,000 t but, as it still distributes cement by barge from Alabama into the Big rivers system and Texas

Figure 1. Cement surplus or shortage by state and the resulting internal cement flows and imports.

the Mississippi, and from Alabama via the intracoastal waterway (total 700,000 t). In total 1.8 million t of seaborne imports entered Houston. A key importer is Houston XCement (which is owned by three major cement producers in Texas). CEMEX also has a large terminal. Cement consumption in the entire US is growing, meaning seaborne imports into Texas will increase due to the growth in regional consumption, and domestic transfers to the region will dry up and will need to be replaced by imports. It can be expected that Texas will be the recipient of major seaborne import flows in the future.
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and also exports speciality cements into the Caribbean, the overall required seaborne import volume is about 1.7 million t with Florida again becoming a large importer.

The current North American terminal situation
The large number of new and upgrade terminal projects, despite 19 existing terminals remaining mothballed, raises questions about the condition of the current facilities. The first issue could be that import flows have shifted so that a large number of terminals are now in the wrong location. In Figure 2, a map of the US is shown with the locations of all terminals. It should be noted that there are two types of terminals. The first type is the terminal with a shipunloader. These terminals can receive large bulk carriers with cement and are mostly used for the long distance imports from Europe and Asia. The second type of terminals do not have a shipunloader and are dependent on self-discharging vessels to receive its cement. These terminals are generally smaller in size and are used for domestic distribution and imports from Canada and Central America. In Figure 2, the imported regional volumes are shown from before the crisis (2006), the bottom of the crisis (2010), and the rising imports from 2014 – 2017.

Figure 2 also shows which terminals were mothballed during the crisis, which ones were importing cement, and which ones were involved in domestic distribution. Terminals that reopened between 2014 – 2017 are also marked. There are currently 69 terminals in the US that can receive seaborne cement (down from 72 at the start of the crisis). There are 45 terminals with a shipunloader, of which only eight were importing cement during the crisis (and a few were used for domestic distribution). In 2017, 15 large terminals were still mothballed, while 22 have reopened. There are currently 24 terminals without a shipunloader. Of these, four are still mothballed, ten are used for domestic distribution, and ten are used for imports (of which only four were operating during the crisis and six have since reopened). The ratio for import flows into the various regions has changed somewhat, but still does not exceed pre-crisis levels in any region. This means that the wave of new terminals projects is not caused by changing import flows.

The second reason could be that the US cement terminals can no longer meet the changes in the shipping industry and global cement markets that occurred in the crisis years. The key changes in these fields are the move from handymax ships to supramax and ultramax vessels, the shifts in global cement availability, and the increase in the trade of cementitious materials.

During the crisis years, the shipping industry focused on new ship designs, concentrating on cost reduction. The handymax bulk carrier, with a typical cargo size of around 40 000 t, is being replaced by the supramax vessel with a typical cargo size of around 50 000 t and the even larger ultramax of around 60 000 t. These vessels require the same or a smaller crew and have a better fuel consumption than the original handymax. This has consequences for the US terminals, as the vast majority have been built for a cargo size of 40 000 t and therefore have storage capacities of around 60 000 t. Table 1 shows...
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the required storage capacity of a terminal, based on ship size and annual throughput. From this table, it can be concluded that, as long as their annual throughput is below 500,000 t, most US terminals will be able to handle supramax vessels (as long as they can handle the bigger draft of these ships) but above that they will get into logistical difficulties. Table 1 is for one type of cement only. As soon as terminals start importing multiple types of cement or cementitious materials, or receive shipments of the same cement type but from multiple suppliers, then the required storage capacities, number of storage compartments, and truck-loading facilities need to be increased substantially.

While the larger majority of existing US terminals have been built for only one type of material, the global trend is slowly moving towards a more varied supply. When looking at the suppliers base for US cement imports in 2016 and 2017 (Figure 3), some important trends can be seen. While before the crisis Asia used to be the majority supplier with Asian cement reaching the US Northeast and Canadian East coasts, now Europe is the leading cement supplier. Shipment sizes are very small compared to what would be the most economically optimal. Currently about 20% of all imports are in ship sizes smaller than 20,000 t. This is larger than the share of seaborne imports from Canada and Central America, which means that cement from Europe or Asia is still reaching the US in very small vessels. About 45% is shipped in cargo sizes between 20,000 – 40,000 t. This is all from Europe and Asia and not economically optimal. Only 35% of US imports are in cargo sizes larger than 40,000 t and very few shipments are in the 50,000 t range. So far, this less-than-optimal shipping situation was sustainable due to previously low shipping prices and the relatively large share of European cement (which has shorter shipping distances than Asian suppliers). Currently, an increase in shipping costs is creating a larger divergence between shipping cost per tonne in handysize/ handymax vessels and supramax ones. In addition to this, European cement suppliers will be reaching a sold out situation for exports in the coming years, due to increased domestic sales and the growing West African import markets. This means that the anticipated growth in US cement imports will have to come from Asia and this will require the use of supramax vessels, especially on the US East Coast. To meet the changes in shipping and global supply, US terminals will need to expand or be replaced.

Another issue in respect to the suitability of US cement terminals is ownership. Up to and through the crisis, about 95% of US import capability was owned by companies with cement production plants in the US. This allowed for the closing down of import facilities when the crisis occurred, allowing US plants to run at the highest possible utilisation rate. It also explains why US terminals are mostly limited to one type of material. As the terminals are owned by cement producers, they could supply other types of cement and cementitious materials from their domestic plants. During the crisis, and in the years following, a number of mergers and acquisitions have taken place. The result is that, in several regions, the ownership of import capability and ownership of production capacity is out of balance. With seaborne imports at a very low level, this was not a problem. With US plants now reaching full production capability, seaborne imports are needed to keep market

<table>
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<th>Ship type</th>
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<th>0.25 million tpy</th>
<th>0.5 million tpy</th>
<th>0.75 million tpy</th>
<th>1 million tpy</th>
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<td>45 411</td>
<td>53 116</td>
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<td>82 705</td>
<td>86 558</td>
<td>89 411</td>
</tr>
</tbody>
</table>

Table 1. Required storage capacity based on 15 days of buffer capacity and a ship unloading rate of 8000 tpd. This table shows the required storage capacity of a cement terminal based on ship size and annual throughput.
share. With the imbalance between production capacity and import capability, a number of US cement producers will need to find solutions to keep market share. This could result in either new terminals or terminal acquisitions.

When looking at the 16 terminal projects that are currently underway or planned, another ownership aspect stands out. At the end of the crisis, only four out of 69 terminals with the capability to receive cement by sea were owned by ‘independents’ (i.e. companies without cement plants in the US). Of the current 14 terminal projects in the US and Canada, 12 are by independents. The key newcomer is McInnis Cement, with two terminals in Canada supplied by self-discharging ships and two terminals in the US supplied by bulk carriers. Chicago Cement (Ozinga) has built a large import facility in Chicago that is supplied with GGBFS in barges by imports via the Big Rivers. Mitsubishi (as the only US producer) is going to expand its cement import terminal in Long Beach, California. CEMEX, upon expiry of its terminal lease in San Diego, will close this facility but it is likely that a new cement import facility will be realised in this port. Seven new terminals by independents are scheduled to start construction in 2018, on the East Coast and in the Gulf of Mexico, and two independents are in the final phase of expanding their facilities.

Although the 16 projects of terminal newbuildings and upgrades are quite varied in nature, the trend towards larger storage capacities and multiple material capabilities is clear. Also the understanding that cement terminals must have a low capital cost and a large amount of flexibility to handle the big swings in throughput, that are common in cement trade, is visible in the terminal concepts. Two projects stand out in this respect and show the possible future direction of North American terminals. The first is the terminal of Riverside Construction Materials near Philadelphia (Figure 4). After its recent expansion, the terminal is the largest single-user terminal in the world with a total of 170 000 t of storage. It can receive two different types of cement in supramax ships, as well as cementitious material in handsize vessels. With its high level of automation and high speed and flexible truck loadouts, the terminal can operate unmanned with drivers loading their own trucks. What also stands out is the ability of the terminal to handle other bulk materials, such as salt and gypsum, making it resistant against large cement trade fluctuations. This terminal also has a very favourable capital cost compared to its size. The second example is the Beton Provincial terminal in Quebec (Figure 5). After the expansion of its flat storage facility to 100 000 t, this also is one of the largest cement terminals in the world and can handle multiple cement types and cementitious materials. It has a blending tower at the facility, which enables it to supply a range of blended products on a per truckload basis. The terminal is also in the final stages of adding a new-high capacity floating shipunloader that enhances its cost effectiveness.

What can be expected in the coming years?
So far, the growth in US cement imports has been relatively gradual and this has resulted in a slow but steady reopening of terminals by US cement producers that have not seen the need to expand or upgrade these terminals. However, the expected large growth in imports and the very large current price difference between imported and domestic cement have stimulated a lot of new terminal projects, mostly by independents. These new projects do take into account the use of larger ships, multiple material capabilities, and the flexibility to handle large fluctuations in throughput. When the US decides to upgrade its lagging infrastructure, this will result in a major boost to cement imports. This in turn will trigger an upgrade of existing terminals. To restore market share balance in the US, new terminals by US cement producers will need to be realised, although this can also be by cooperation with or acquisition of the new facilities built by independents. Whatever will be the case, the wave of terminal projects looks set to continue.

About the author
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