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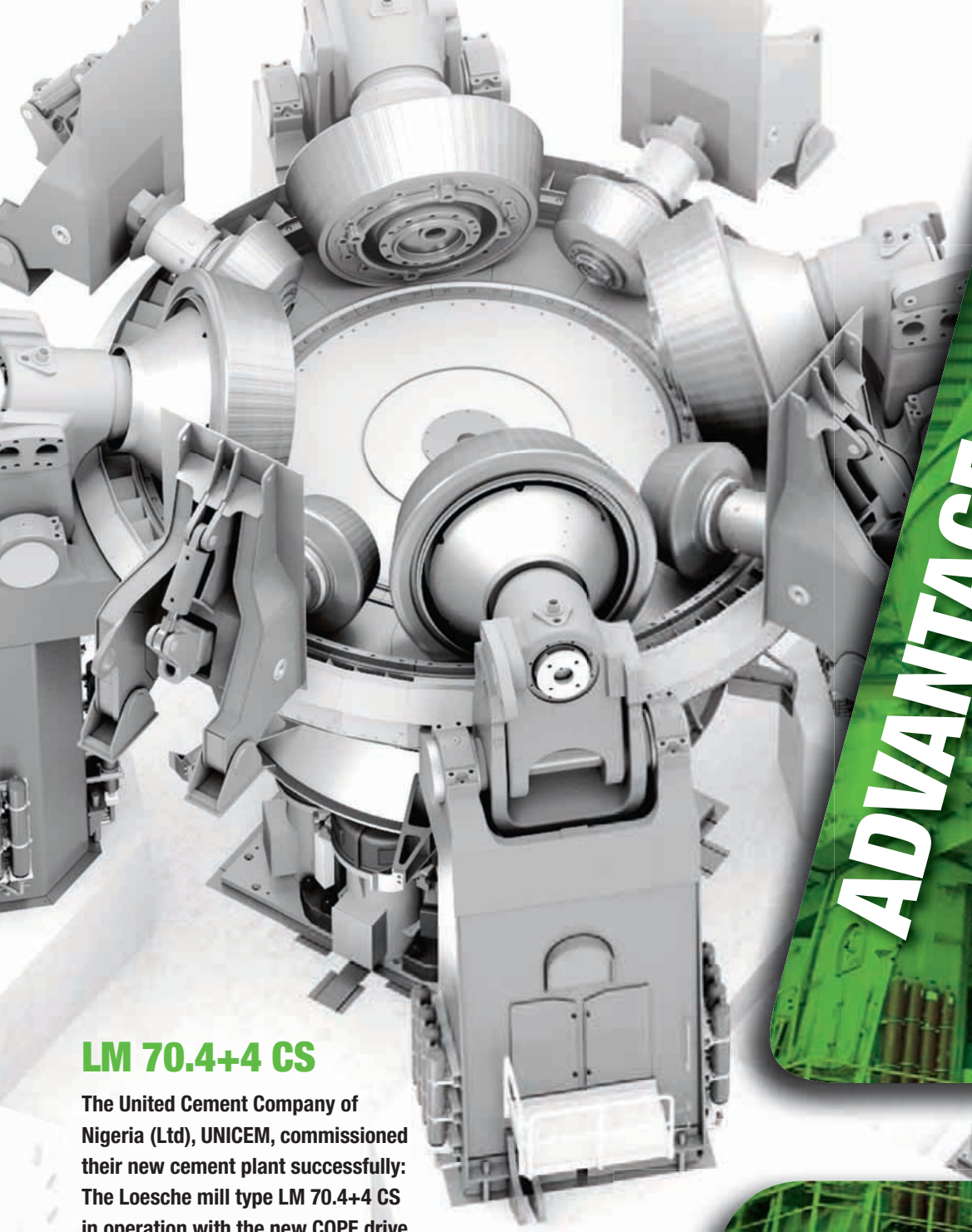
JANUARY 2018

global cement MAGAZINE



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Dear readers,

Welcome to the January 2018 issue of *Global Cement Magazine* - and Happy New Year! The global cement sector has seen a great deal of consolidation in the past two or three years, with the LafargeHolcim merger, HeidelbergCement's acquisition of Italcementi and now the merger of CNBM and Sinoma in China. CNBM is the largest cement company in the country with a reported total capacity of over 400Mt/yr. Sinoma is a cement engineering company and the fourth largest cement producer in China with a total production capacity of ~112Mt/yr. Their combination, due in the coming months, will create an entity almost twice the size of LafargeHolcim. It will have knock-on effects for the construction of plants inside and, crucially, outside of China. Indeed, Sinoma has just announced plans for a US$1bn cement plant in the Tanga region of Tanzania (Page 62). On the same page is the news that Dangote Cement has commissioned another Sinoma project, its 1.5Mt/yr plant at Mfila, Congo. The plant is part of a raft of US$4.3bn of Sinoma contracts awarded by Dangote in the past few years. Elsewhere in 2017 Sinoma plants were commissioned in Algeria, Angola, Nigeria and Zimbabwe. There are also projects ongoing in Algeria, Egypt, Georgia, Sri Lanka and Uganda. With the Chinese market likely to offer far fewer new-build opportunities in the future, where else will Sinoma (and other Chinese players) venture in 2018?

What else can we expect over the next 12 months? Well, the positive noises from LafargeHolcim's Sagunto plant in Spain (Page 26) do not disguise the difficult position faced by much of Europe. A year of stability and no surprises would be welcomed. With the exception of Argentina (positive) and Brazil (negative), South America is also looking pretty stable (See Page 48). Meanwhile, the PCA's enthusiastic US cement consumption forecasts of spring 2017 were scaled back in the autumn and are due for review again in January 2018. It will be interesting whether any 'Trump-based momentum' will have been retained. In India, a microcosm of the global sector, consolidation is the word. Finally back to Africa, will anyone buy PPC?

Of course, some things never change - In 2018 you will always be able to keep up-to-date with all of the latest global cement news and trends in the print and digital versions of *Global Cement Magazine*, online at *www.GlobalCement.com* and via our *Global Cement Weekly* newsletter.

We hope that you enjoy this issue of *Global Cement Magazine!*

PKEdwards

Peter Edwards
Editor

Cement Industry Suppliers' Forum

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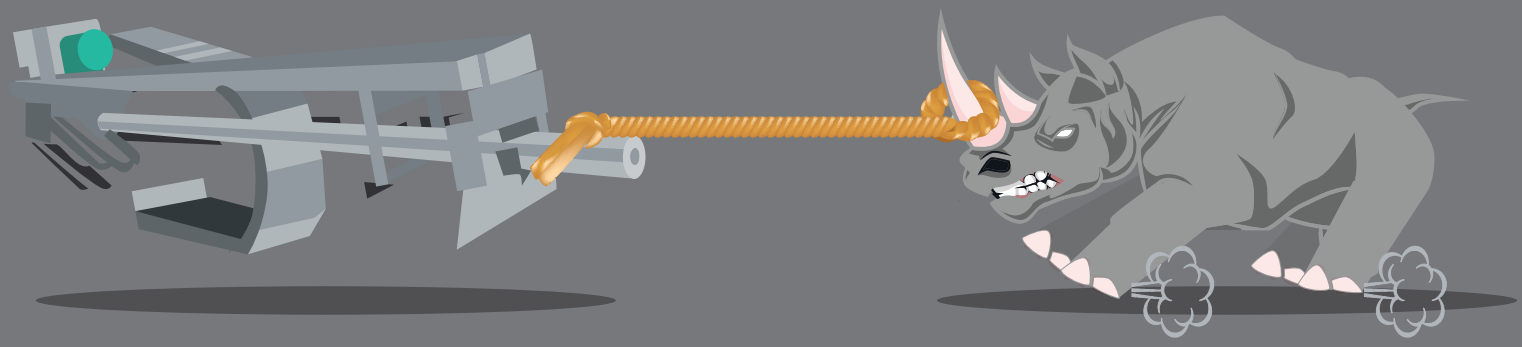

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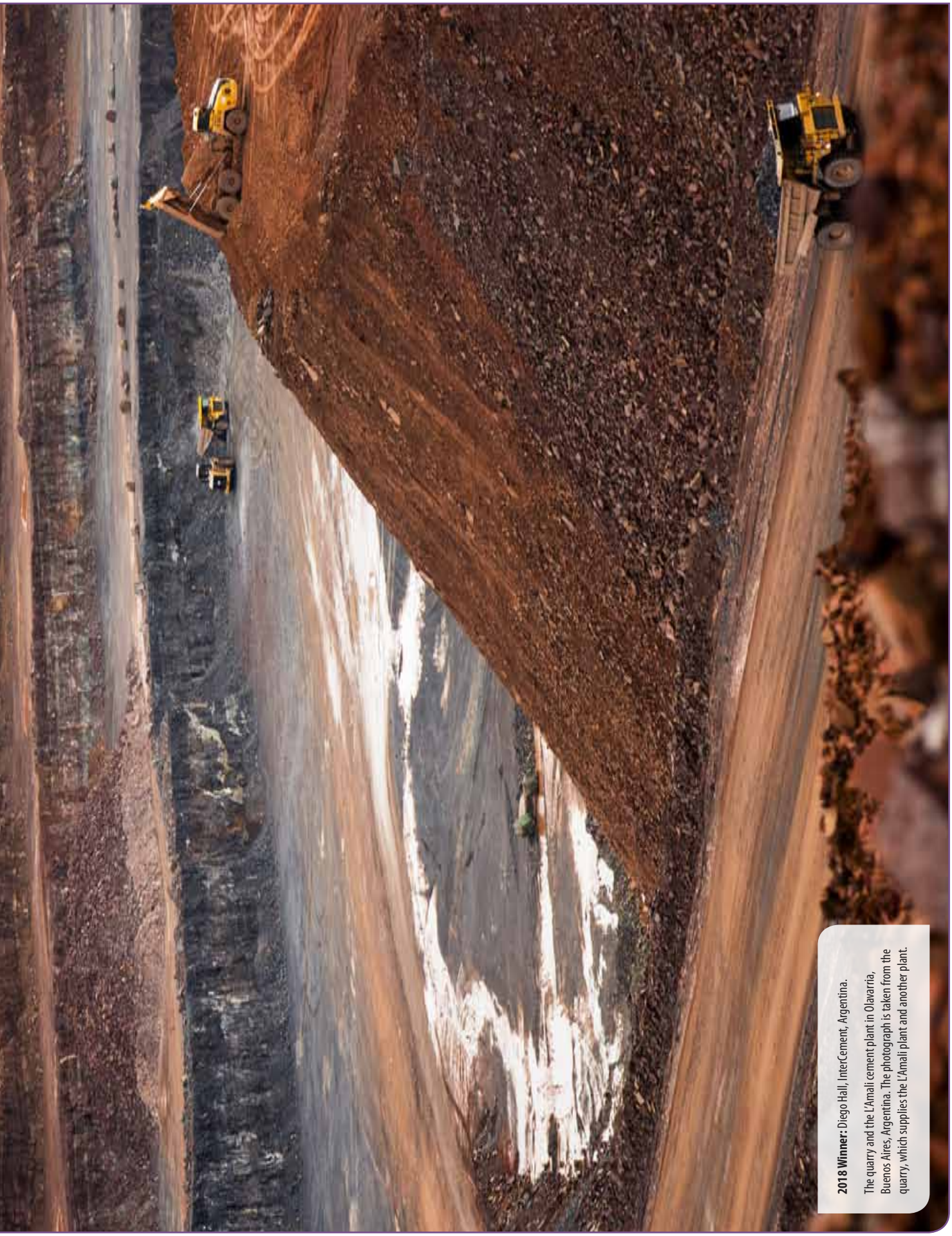

2018 Winner: Diego Hall, InterCement, Argentina.

The quarry and the L'Amali cement plant in Olavarria, Buenos Aires, Argentina. The photograph is taken from the quarry, which supplies the L'Amali plant and another plant.

2018 Second place: Jose Morel, Yguazú Cement, Paraguay.

The plant is shown after a river flood.

Runner-up: Paul Touliatos, Titan Cement, Greece.

This photograph shows the interior of one of the two new cement silos that were built at the Drupano plant in 2017.

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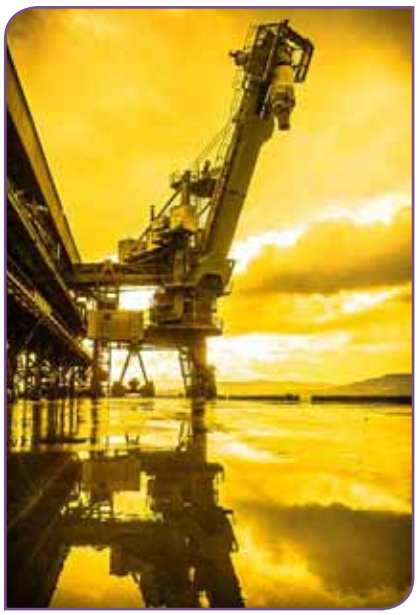
Above - Runner-up: Paul Touliatos, Titan Cement, Greece.

This photo shows the dopol (pre-heater) of the Kiln No2, shot through the nearby trees.

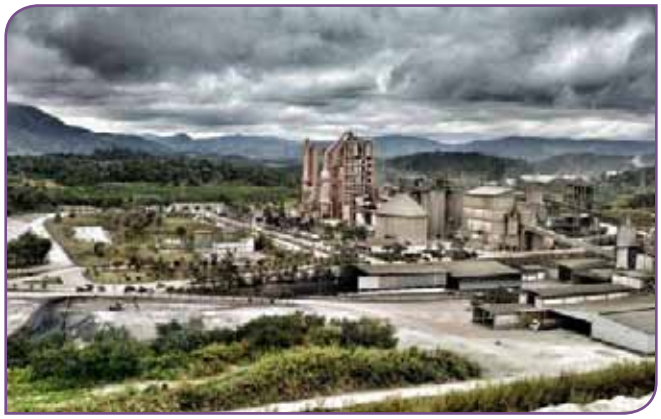
Above - Runner up: Jan Szczepański, Grupa Ozarow, Poland.

Close-up image of cement bags in the packing plant of the cement plant in Ozarow, Poland.



Above - Runner-up: Gloria Rango, OMG MGM Cranes, Italy.

Two cement and clinker export terminals at the Medcem cement plant in Turkey.



Above - Highly commended: Romildo Pereira, InterCement, Brazil.

Above right - Highly commended: Jim Curto, InterCement, Mozambique.

Below - Highly commended: Ewa Gawlik, Grupa Ozarow, Poland.

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Alfonso Rivera, ELE International

Testing cement for quality and reliability

Cement performs a vital role in the construction industry. However, as it is a manufactured material created by a complex process that involves multiple ingredients, testing is essential to ensure compliance with specification and application-specific requirements. In the following article Alfonso Rivera, Technical Department and Field Service Manager for ELE International, reviews the most important tests and provides an update on relevant standards.*

*The standards quoted were reviewed by Shuangkai Wu, Design Engineer at ELE International, and were correct at the time of writing.

Compressive strength

Compressive strength is one of the most important properties of concrete and mortar. The strength of the binder (cement) therefore has a significant effect on the performance characteristics of the mixture and ensures the overall quality of the finished product. The test for compressive strength is generally carried out by crushing cubes of hardened cement-sand mortar in a compression machine. The compressive strength of the cubes is determined by the highest stress applied to a cube specimen that causes it to fracture. The test equipment required for this purpose includes a compression machine, a mortar mixer, suitable moulds, a humidity cabinet, the cement itself and test sand. The applicable standards for Compressive Strength are: EN 196-1, ISO 679, EN 459-2, EN 1015-11, EN 13454-2, ASTM C109/C109M, ISO 7500-1 and ASTM E4.

Tensile strength

The tensile strength of cement is relatively low when compared to its compressive strength. Concrete structures are vulnerable to tensile cracking due to a variety of effects including dynamic loading and temperature variation. Tensile strength tests can be carried out to gain an understanding of the cohesion between the cement particles. The tensile strength is proportional to the compressive strength and the tests are simple and inexpensive to perform, so they are relatively popular.

The most common tensile strength test on cement is conducted by the application of uniaxial tension. This test is carried out by moulding cement-sand mortar briquettes, which are placed in a machine that can apply a tension load. The tensile strength is calculated by measuring the load required to split the sample in half over the section of the fracture.

When a uniaxial tension machine is not available, tensile tests can also be carried out by other indirect methods. For example, in the split cylinder test, a sample in the shape of a cylinder is loaded laterally until fracture occurs. An alternative method is the flexure test, in which a mortar beam is loaded between two supports to apply a bending stress; which causes the fibres in the lower half section of the beam to develop tension stresses, until failure occurs. It should be noted that these tests give a higher tensile strength value than the uniaxial tension method.

Typical laboratory equipment for tensile strength testing of cement would include a 10kN flexural/tensile testing machine, briquette moulds, a mortar mixer, a humidity cabinet, the cement itself and test sand. Applicable standards include ASTM C307 and EN 196-1.

Fineness

The final stage of cement production involves grinding to form a fine powder containing particles of significantly different sized particles. The particle size distribution has a major influence on the rate at which a cement sets and gains strength, and can affect other factors such as workability and drying shrinkage. The smaller the particle, the larger the surface area of the powder in relation to the volume, so as cement reacts

Right: Quality concrete relies on quality cement...
...and appropriate testing.

Left: A Blaine Air Permeability apparatus.

with water, the smallest particles contain the largest number of contacts and have a high participation in the process of setting and hardening.

The fineness of cement is tested by measuring the air permeability specific surface area of the cement powder. The measurement of fineness of hydraulic cement is undertaken with the Blaine air-permeability apparatus to determine the specific surface expressed as the total surface area in square centimetres per gram (or square meters per kilogram). The test is carried out on a compacted sample of cement at room temperature at 18-22˚C by measuring the time taken for a fixed quantity of air to flow through the cement sample. The recorded time is a proxy for the specific surface area. The method is a comparative test between a known and unknown material, therefore a reference sample with a known surface area is used for calibration. By measuring the time taken for air to flow through the reference material, the user can establish a correlation of the surface area based on the time taken on the test cement. The Blaine Apparatus is employed for this test and consists of a permeability test cell, a perforated disk, a plunger, filter paper, a manometer U-tube, manometer liquid, reference cement and a timer. The applicable standards are EN 196-6, ASTM C204 and AASHTO T153.

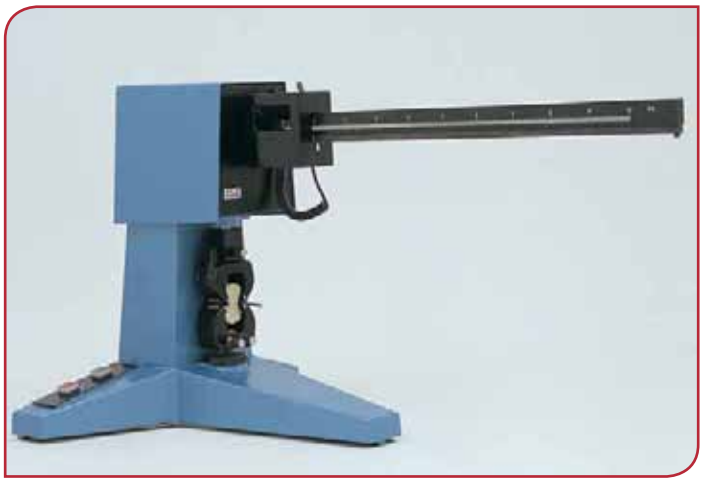
Consistency, setting time and flow

The consistency of a mixture plays an important role in the performance of the mix when poured through reinforcing bars within a form, and in the time taken for the mortar or concrete to set. The consistency test is performed to estimate the amount of water needed to form a paste of normal consistency, defined as the percentage water requirement of the cement paste.

When water is added to cement, the resulting paste will begin to harden and gain compressive strength. The Vicat needle test measures the time taken for the cement-water mixture to harden or 'set'. Consistency is measured by the Vicat test, which provides both initial and final setting times – measurements that can be regarded as the two stiffening states of the cement. The beginning of solidification, or the initial set, marks the point in time when the paste has become unworkable, and the time taken to completely solidify marks the final set. This should be short enough that construction activity can be resumed within a reasonable time after the placement of concrete.

The Vicat plunger has a specified weight, dimensions and drop height, and the resistance to penetration by the plunger is determined by the viscosity of the cement paste in a mould. The initial setting time is defined as the time taken for the Vicat needle to be able to penetrate the paste in the mould to a depth of 5mm. The final setting time is the time taken for the cement paste to harden sufficiently such that the Vicat needle cannot penetrate the cement paste in the mould and leaves no mark on the surface of the specimen. The required equipment includes a Vicat frame, Vicat needles and mould (EN or ASTM), glass graduates and mixing tools. Alternatively, ELE manufactures an automatic Vicat apparatus. Applicable standards include: EN 196-3, EN 480-2, EN 13454-2, ASTM C187, ASTM C191, AASHTO T129 and AASHTO T131.

Left: Vicat apparatus.



Right: A 10kN tensile flexile machine.

Determination of consistency can also be carried out by using a Flow Table Test Apparatus. While flow is not usually included in hydraulic cement specifications, it is commonly used in standard tests that require the mortar to have a water content that provides a specified flow level. Cement paste acts as a separator for aggregates in mortar, and a lack of sufficient mortar results in a mixture of limited flow. Such mixtures are prone to segregation and are difficult to finish.

A cement paste or mortar mix is placed in a mould of defined volume and dimensions, and the mould is placed on top and in the centre of a flow table apparatus, where the sample is formed and compacted. The mould is then removed, leaving behind the formed sample of mortar, which is then raised and dropped from a height of 12.5mm, 15 times in approximately 15 seconds. After the dropping sequence, the diameter of the spread of the mix is measured. The flow of the mix is the percentage increase in diameter of spread mix over the base diameter of the moulded mix. The key items for this method are the flow table, mould and calipers. ELE also offers an alternative motorised unit. The applicable standards are ASTM C230/C230M.

Soundness and expansion of cement and fly ash

Soundness refers to the ability of a hardened cement paste to retain its volume after setting without delayed destructive expansion. As such, soundness is an extremely important test. A sound cement paste will not undergo any appreciable change in volume after it has hardened and shall not therefore be susceptible to the development of cracks. A sound cement paste is the base of a sound mortar or concrete mix.

Fly ash is a by-product of coal-fired power generation. During combustion, mineral impurities in the pulverised coal are expelled from the combustion chamber in the form of fused particles in suspension with the flue gases. As these particles cool, they solidify into spherical glassy particles. Fly ash exhibits cementitious properties and is used in concrete as a replacement or partial replacement for cement. Un-soundness can arise from the presence of too much free magnesia or hard-burned free lime in the cement.

Soundness of cement can be determined by a variety of methods. In the Le Chatelier water bath method, a specimen of hardened cement/fly ash paste is placed in a mould and boiled for a fixed amount of time (approximately 3hr) so that any tendency to expand is speeded up and can be detected. After the boiling process is completed, the distance between two control indicator points is measured to the nearest 0.5mm and compared to the original length measured before the test. This test requires a Le Chatelier water bath, a Le Chatelier mould, caliper, measuring cylinder, balance and length comparator. Applicable standards include EN 196-3, EN 459-2 and EN-450.

Right: Cracks in concrete are likely when cement is unsound.

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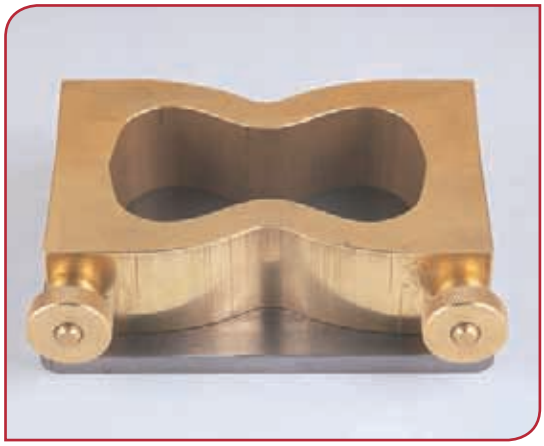
Right: An ELE ADR CONTROL PRO 250-25.

measurements. The equipment required for this method includes an autoclave, test bar moulds, mixing equipment, a balance and a length comparator. Applicable standards include ASTM C151 and AASHTO T107.

The expansion of cement can also be determined by the length comparator method. The length comparator is a device used for measuring length changes of cement paste, mortar and concrete in accordance with ASTM and AASHTO specifications. The unit consists of a sensitive dial or digital indicator mounted on a sturdy, dual post construction frame. Movable and stationary anvils are shaped to receive the reference pins which are cast into the ends of the test specimen bars. ELE supplies a variety of devices for this method, including the drying, shrinkage and moisture movement apparatus, as well as the ASTM length comparator. Applicable standards include ASTM C151, C157, C227, C490, C531, AASHTO T-107 and T-160.

Alternatively, soundness of cement can be determined by the autoclave method. This test covers the autoclave expansion of Portland cement by means of a test on a neat cement specimen. Specimens are formed in an oil covered mould with reference points attached at a reference length of 250mm. The specimens are extruded from the moulds and measured after 24hr and placed in the autoclave at room temperature. After the autoclave is sealed, the specimens are exposed to high pressure saturated steam for a defined length of time. After the heating is complete, the specimen is measured and compared to the original length



Right: A briquette mould.

Right: An ELE mortar mixer.

Summary

This article has provided an indication of the basic equipment required for each of the most important cement property tests. It is vitally important to follow the correct method and to use appropriate, properly serviced equipment. Errors or failures in the construction sector can be extremely dangerous and expensive. The costs involved in testing are negligible in comparison with overall project costs, so there can be no excuse for inadequate or incorrect testing. For this reason, ELE International's motto for over 50 years has been 'If something is worth building; it's worth testing' and, as this article has highlighted, with the correct equipment and suitably trained staff, correct testing is simple to perform.

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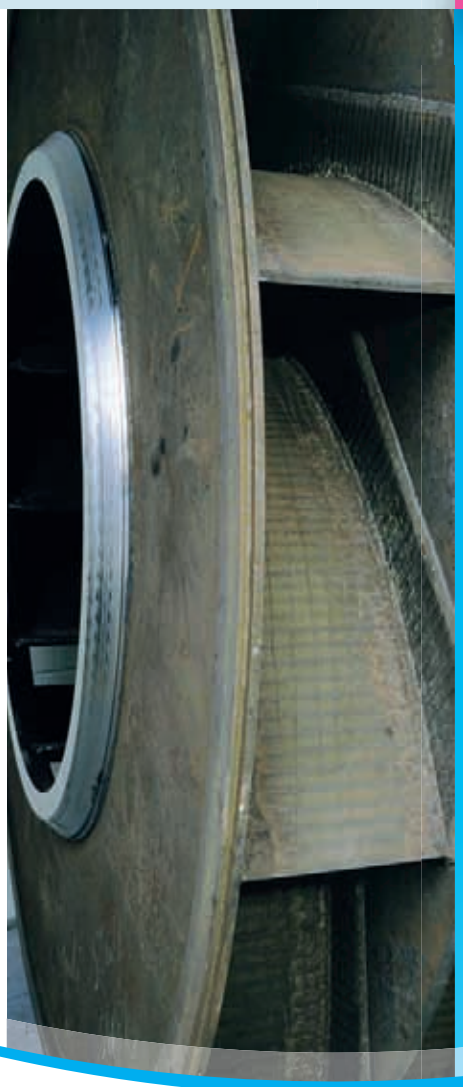

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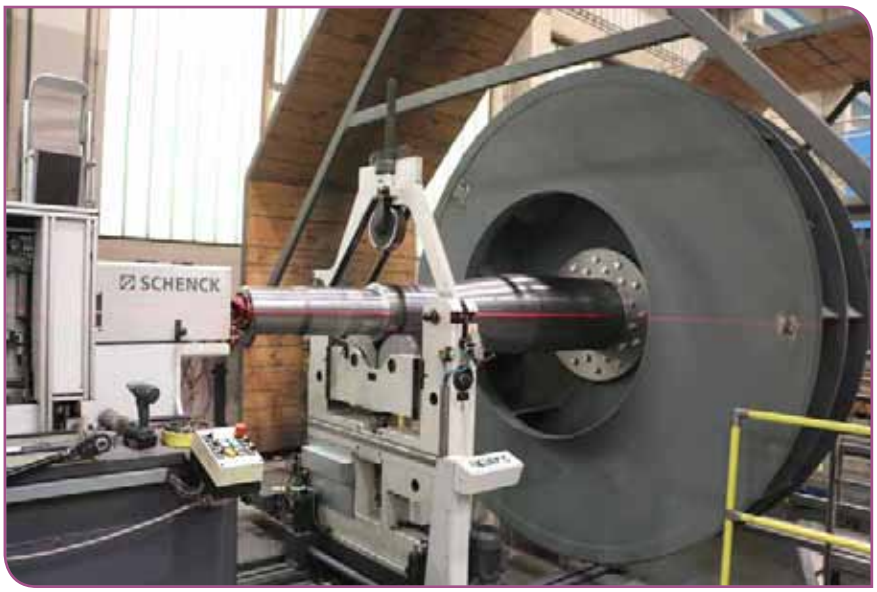
Visiting Venti Oelde

Global Cement recently visited the Oelde headquarters of renowned industrial fan manufacturer Ventilatorenfabrik Oelde GmbH. Here the company shows off its latest projects for clients in the global cement industry...

Right: An impeller with wear protection for use in a pre-heater fan. The piece is destined for a cement works in Turkey.

Left: The Rotor for a filter fan, ready for dispatch, flanked by Peter Herrmann (General Manager Fans Division) and Inge Teich (Marketing) of Venti Oelde. The fan is for an Egyptian cement works. Impeller diameter = 2700mm.



Left: The rotor of an exhaust air fan on the balancing machine. The fan is destined for a cement grinding plant in Ivory Coast. Volume flow = 1,000,000m^3/hr.

Right: Impeller for a cement works in Egypt. The impeller is intended for a mill fan downstream of the cyclone-separator. It has a special wear protection (chromium carbides) on the blades and in the area of the impeller centreplate. The photo was taken after stress-relief annealing. Impeller diameter = 3400mm. Drive power = 3600kW.

Left: Detail: wear protection on an impeller blade

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Above: A Gebr. Pfeiffer Ready2Grind site during construction in Vipingo Ridge, Kenya.

Costa Rica: Ready2Grind plant for Cementos Fortaleza

Gebr. Pfeiffer is in the process of supplying a Ready2Grind modular grinding plant to Cementos Fortaleza's new 300,000t/yr plant at Salinas Esparza in Puntarenas. The project is a joint venture between Mexico's Cementos Fortaleza and fibre cement producer Plycem. Production is scheduled to begin in the first quarter of 2018.

The project scope includes: a clinker mill feed system with four hoppers; a MVR 2500 C-4 clinker roller mill with classifier and ancillaries; process filters, hot gas generator and fan; electrical controls and drives; cement transport and three storage silos; packing plant and bulk loading systems; and monitoring and coordination of erection as well as commissioning of the grinding plant.

Nepal: Loesche to provide coal mill to Chaudhary Group project

The German vertical roller mill (VRM) producer Loesche GmbH has gained a new customer in Nepal. The cement division of Chaudhary Group, based in Kathmandu, has placed an order for a 25t/hr vertical roller mill for coal grinding for the 3900t/day (1.3Mt/yr) integrated cement plant that it is building in the Palpa region.

Loesche received the order though KHD, the lead bidder at the plant. The LM 26.3 D mill will be in operation during 2018 with a throughput of 50t/hr, 15% R on 90µm.

Right: A Loesche type LM 26.3 D vertical roller mill for the grinding of brown coal at a cement plant in Nallalingayapalli, India.

Netherlands: New Van Beek vertical silo mixer

Van Beek has developed the vertical silo mixer for mixing and homogenising free-flowing, dry substances of different sizes and bulk densities. The silo mixer creates mass flows within the mixing silo. Its operation is compared by Van Beek to that of a chocolate fountain.

The silo acts as a mixing vessel containing a vertical central tube fitted with a mixing screw. The mixing screw transports the product to be mixed from the bottom to the top and carries it upwards, after which an (optional) distribution plate spreads the product. By gravity and due to the fact that the mixing screw creates space at the bottom, the product next to the mixing screw falls back down on its own.

Using a silo as a mixing vessel gives a large mixing capacity and no residual product is left behind from a previous batch. The maximum diameter of the silo is 3.5m with a maximum capacity of 60-70m^3/hr.

Above: The new Van Beek vertical silo mixer.

Netherlands: Reijnders buys Dino

Reijnders BV, a leading trader in coal products in the Netherlands, has purchased a Dino mobile bulk truck loader from Van Beek. The purchase has simplified and speeded up the process of loading trucks. Before purchasing the Dino the big bags were held and emptied with a shovel, with a loader above the bulk truck. The job required three people. Now the company can do the same job with just two. The emission of dust from the process has also been greatly reduced due to the Dino's dust filter system.

Right: Reijnders' new Dino.

China: Anhui Conch Cement signs agreement with China Railway Materials Trading

Anhui Conch Cement has signed a strategic cooperation agreement with China Railway Materials Trading, a subsidiary of China Railway Group. Yu Shui, the assistant general manager of Anhui Conch, and Xiao Song, deputy general manager of China Railway Materials Trade Group, signed the agreement. Anhui Conch plans to establish a supply chain agreement with the state-owned company.

Tunisia: Export contract for Carthage

Carthage Cement has secured a contract to export 350,000t of clinker to sub-Saharan Africa in 2018. The deal will enable the cement producer to enter this market for the first time. Neither the name of the other company nor the exact destination has been disclosed.

Pakistan: Cherat Packaging and Mondi hit half-billion cement bag milestone

Cherat Packaging, a producer and supplier of packaging to the cement industry, and Austria's Mondi have made over half-a-billion cement bags since 2002. The local bag manufacturer has a bag production capacity of 600m/yr. It holds country-specific exclusive rights to use Mondi's brown sack kraft paper to produce cement bags and has bought only Mondi paper for its use in the last 15 years.

"The bags had to be suitable for rough handling and fast, dust-free filling, and we wanted to deliver further benefits, such as material and cost savings. Mondi's Advantage Select paper was the perfect choice. The 80/85gsm variant has revolutionised paper bag sales in Asia as it has provided us as well as our customers with high quality, low cost solutions. It has allowed us to use two plies instead of three and to dispense with perforation, which has significantly reduced paper consumption and dust at our clients' premises. The bags are lighter, yet stronger than the previous three-ply versions," said Amer Faruque, the chief executive officer (CEO) of Cherat Packaging.

The company's paper division has exclusive rights from Mondi for procurement of sack kraft paper in Pakistan and supplies two-ply 80/75gsm 50kg bags to Cherat Cement, a sister subsidiary within the Ghulam Faruque Group. In October 2017 Cherat Packaging commissioned a Windmöller & Hölscher universal paper sack line.

Iceland: Demolition of Akranes cement plant

Iceland Cement has started demolishing its cement plant at Akranes. The nine hectare site in the town will be used for housing and other projects, according to the Iceland Review magazine. FLSmidth originally built the plant, which began operations in 1958. It stopped manufacturing cement in 2012 when the company switched to imports from Norcem in Norway. Germany's HeidelbergCement is the majority owner of the company.

Right: When the Akranes cement plant was in operation, it used crushed seashells as its source of calcium carbonate for its clinker.

Spain: Sagunto plant to hit 100% production in 2018

The LafargeHolcim plant in Sagunto, Valencia, did not stop during the Christmas and New Year holidays for the first time in 10 years, representing a significant improvement in the plant's economic fortunes. The plant now plans to operate at 100% of capacity during the rest of 2018 to produce around 2.3Mt of cement. This, again, will be the first time for 10 years. In 2013 it produced only around 0.6Mt of cement, around a third of what is expected in 2018.

The plant's reversal of fortunes have been due to two main factors. One is the general economic recovery and associated rejuvenation of the construction sector in the Valencia and Castellón regions. According to the plant's outgoing plant manager Miguel Ángel Urbano, speaking in December 2017, this will mean a return to greater margins and indicates that the plant successfully diversified during the downturn by, for example, switching focus to higher margin products like oil well cement.

The fact that the plant has diversified leads on to the second reason that the plant will return to full production in 2018. It will produce a special alkaline cement that is mandatory for use in subsoils in Paris, France. According to Urbano, ordinary cement becomes 'a type of gel' in the subsoil of Paris, which is abnormally cold. The plant is the only one that can produce the required specification in France or Spain. It will make 0.25Mt of it in 2018, helping its exports to rise by 30-40%.

The plant has additionally received permission to extend the operation of its Salt del Llop quarry until 2042. In the short term, the company plans to invest Euro6m in equipment and systems and will expand its workforce by 12 to develop the quarry.

Below: The LafargeHolcim Sagunto plant.

Spain: Changes to Lafarge Spain management

Vicente Pedro has been appointed as the new plant manager of Lafarge Spain's Montcada i Reixac plant near Barcelona. He succeeds José Luis Coleto, who will take over the management of the Sagunto plant in Valencia (see story, left).

Pedro trained as an industrial engineer at the Universitat Politècnica de València. He has worked for LafargeHolcim and its predecessor companies for over 30 years spending time at plants at Spain, Venezuela and Brazil. More recently he has managed the company's capital expenditure projects in Spain. The outgoing Sagunto plant manager Miguel Ángel Urbano has taken up a new position within LafargeHolcim's headquarters.

Germany: EC clears acquisition of Fels-Werke by CRH

The European Commission has approved the acquisition of Fels-Werke by Ireland's CRH. Fels-Werke is active in mining, processing and distribution of lime and limestone products, gypsum and mortar in Germany, Czechia and Russia. The commission concluded that the proposed acquisition would raise no competition concerns because there is limited geographic overlap between the companies' activities. It described them as 'remote' competitors.

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Germany: HeidelbergCement secures innovation and research loan

A US$180m loan for innovation and research programs has been signed between HeidelbergCement and the European Investment Bank. The cash is largely destined for activities in Germany, but some US$12m will also go towards activities in Italy, where the group controls Italcementi and is about to complete the purchase of Cementir Italia (see right). The financing was agreed on 4 December 2017 and will form part of a Euro369m investment in research and innovation in the period to 2020. Part of the resources will serve to modernise the Schelklingen plant in Baden-Württemberg.

The loan will help the company to increase its competitiveness through greater efficiency, lower costs, better materials and lower energy consumption.

Italy: Authority approves acquisition of Cementir Italia by HeidelbergCement

The Italian Competition Authority (AGCM) has approved the purchase of Cementir Italia by HeidelbergCement's subsidiary Italcementi, subject to the sale of certain assets. The ICA says that the sales are necessary to prevent excessive concentration in the sector. The assets in question are: The Cagnano Aminterno (L'Aquila) cement plant and the terminal at Reggio Calabria, currently owned by Cementir; the Maddaloni (Caserta) plant, currently owned by Cementir; the production facility at Spoleto, currently owned by Cementir, and the production plant at Salerno, currently owned by Italcementi.

Ireland: EPA starts action against Irish Cement

The Environmental Protection Agency (EPA) has started legal action against Irish Cement for alleged breaches of its operating licence at its Limerick plant. A court summons is related to dust 'blowouts' from the plant, according to the Limerick Leader newspaper. The case is scheduled to come before the Limerick District Court in early March 2018. The EPA also investigated dust emissions from the plant in April 2017.

Italy: Fine deferred to June 2018

Appeals by Italian cement producers to the judiciary of Lazio against fines imposed by the Italian Competition Authority (AGCM) have been deferred to June 2018. Italcementi, Buzzi Unicem, Colacem, Cementir, Sacci, Holcim, Cementirossi, Barbetti, Cementeria di Monselice, Cementizillo, Calme, Moccia, TSC and the Italian Cement Association (AITEC) were penalised more than Euro184m in July 2017 for allegedly coordinating sales prices and agreeing market share from June 2011 to January 2016, according to the ANSA news agency. The majority of the fine was levied on Italcementi and Buzzi Unicem at around Euro84m and Euro60m respectively. Italcementi started appealing against the sanctions in August 2017.

Germany: Markus Bochynek to leave management board of Aucotec

Markus Bochynek is to leave the management board of Aucotec in April 2018. His responsibility for sales and marketing will be taken over by fellow board member Uwe Vogt. The other board member, chief executive officer (CEO) Horst Beran, will remain in post. The existing management team below the management board will assume some of the previous responsibilities and tasks of Vogt and Bochynek. The engineering software company is also planning to build a new head office in 2018.

Sweden: Sandvik completes the divestment of Sandvik Process Systems

Sandvik has completed the sale of its Sandvik Process Systems division to asset management company FAM AB. The divestment was agreed for around Euro500m in June 2017. Sandvik Process Systems manufactures industrial process solutions based on steel belts, steel belt based equipment and process solutions within adjacent technologies.

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UK: Tarmac swaps quarries for Breedon concrete plants

Independent aggregates and concrete specialist Breedon has struck a deal with Tarmac to swap a swathe of ready-mixed concrete plants for four quarries. Under the deal, valued at Euro18.8m, Breedon will hand 27 ready-mix concrete plants to Tarmac with a Euro5.6m cash payment for the quarries and an asphalt plant. The deal is subject to approval by the Competition & Markets Authority.

The quarries to be exchanged are located in Scotland, Cumbria and North Wales, together with a quarry and asphalt plant in West Wales. Ready-mixed concrete operations being offloaded from Breedon's network of 200 plants are in multiple locations extending from Dumfries in Scotland to Exeter in Devon.

Russia: Power station for Kavkazcement

Kavkazcement, a member of Eurocement Group, has started the construction of a gas-piston thermal power station with a capacity of 24MW. The station will be fitted out with equipment manufactured by Finland's Wärtsila. The station construction is planned to be completed by 2019. The investment in the project will be around Euro19.1m.

The project is being implemented under the Eurocement Group programme for provision of in-house electricity generation, which will increase energy efficiency and environmental safety of production.

Switzerland: Energy-generating concrete

LafargeHolcim, together with its partner Heliatek, has developed a unique photovoltaic energy-generating concrete façade that has the capability to double the energy generation traditionally achieved by roof-based solar systems. LafargeHolcim and Heliatek have closely collaborated over the last two years to create a cladding solution combining Ductal® and HeliaFilm®, Heliatek's flexible and ultra-light solar film. With this new solution, prefabricated Ductal panels are delivered on site with an integrated solar energy-generation system.

This cladding boosts the building's ability to generate energy independently and offers a reliable, decentralised and decarbonised energy supply. A 10 storey commercial building covered with 60% of its facade with the Ductal/HeliaFilm cladding system could generate approximately 30% of its annual energy requirement.

Gérard Kuperfarb, Group Head of Growth & Innovation at LafargeHolcim said, "LafargeHolcim seeks to offer sustainable, high-performance construction solutions that improve energy efficiency for buildings. With this Ductal/ HeliaFilm solution, building owners and developers as well as architects and engineers will be able to mitigate the energy costs of a building while enjoying the many benefits of a very light, low maintenance and long-lasting cladding solution."

Maarten De Groote, Jonathan Volt & Frances Bean, Buildings Performance Institute Europe (BPIE)

Opening the door to smart buildings in the EU

The Buildings Performance Institute Europe (BPIE) looks at how EU legislation needs to change in order for smart buildings to take hold in Europe in its new report *'Opening the door to smart buildings.'* The report is timely, considering that EU bodies are currently in the process of recasting crucial Directives pertaining to energy efficiency in buildings.

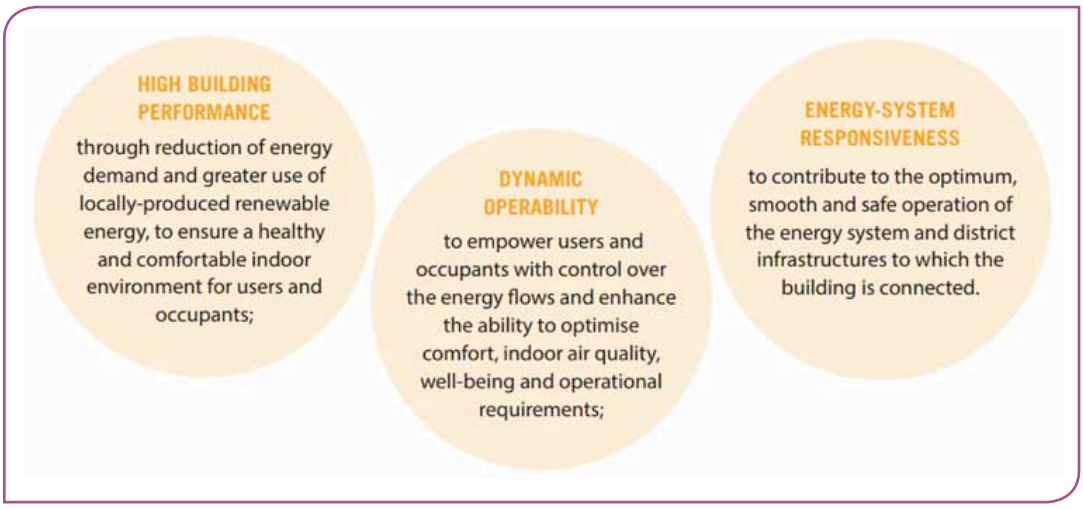
A more efficient and smarter building stock is a cornerstone of a decarbonised energy system. Increased integration of distributed energy resources, renewables and storage and the growing peak demand for electricity will drive the need for increased flexibility, demand-response capabilities and consumer empowerment to further develop an affordable, reliable and decarbonised energy system. Buildings have the potential to be at the forefront of providing flexibility to the energy system, through improved energy production, control, storage and demand-response.

Market frameworks and regulation need to allow buildings to connect to and interact with the energy system. To date, this is not always the case across the European Union (EU). For example, many EU Member States do not allow residential buildings to participate in demand-response activities,[1] thus innovation and development within this field are being delayed. Without a forward-looking legislative framework, the EU risks losing out to other markets in terms of competitiveness and innovation. Current policy discussions lack ambition to encourage buildings to play their role as micro energy-hubs.

Smart buildings enable and ensure a healthy and comfortable living and working environment for their occupants. To be considered smart, a building should encompass functions that include automation and user-friendly controls. The 'smartness' of a building depends on the capacity of its functions and the inter-operability of its different components. The concept of smart buildings has been explored in BPIE's previous reports.[1-3]

One of the biggest barriers to a revolution and a widespread penetration of smart buildings across the EU is its legislative framework. Existing legislation should be revised and future-proofed in order to support the features of smartness and envisage a

Right - Figure 1: A smart meter. So far rollout has only been completed by four Member States: Italy, Estonia, Sweden and Finland.



Left - Figure 2: Features of the Smartness Indicator, as recommended by BPIE. **Source:** BPIE.

future smart building stock in Europe. This means highly energy-efficient buildings that drive a faster decarbonisation of the energy system, empower their users and react to their needs in terms of comfort, health, indoor air quality and safety.

While the proposed Clean Energy for All Europeans policy package[4] makes some incremental steps in the right direction, several of the proposed measures must be clarified and others should be added for the package to fulfil its purpose. The report *'Opening the door to smart buildings'* links the support needed with the relevant legislation that either currently exists or has been recently proposed by the European Commission. It also assesses whether the actions to be taken are sufficient. It is summarised in this article.

EU policies should ensure buildings can take up a leading role in the energy transition, at the same time as ensuring high building performance, dynamic operability between components of a building and its occupants and responsiveness of buildings to interact with the energy system around them.

Europe's innovation and technology leadership could gain much-needed support through this transformation of the building stock, benefitting both the economy and European citizens, by providing healthier places to live and work, as well as innovation and jobs in the construction sector. Innovation within the information and communication technologies (ICT) and clean energy sectors is progressing rapidly. If the EU is unsuccessful in adapting and upgrading the current legislative framework, there is a risk of not just hampering the development, but also locking-in the use of soon-to-be-outdated technologies.

On 30 November 2016 the European Commission released important pieces of European energy legislation in the *'Clean Energy for all Europeans'* package. The package covers energy efficiency, renewable energy, the electricity market, consumers and governance rules for the Energy Union. Currently, the package is being negotiated between the European Commission, the EU Parliament and the Council. The result will be a once-in-a-decade opportunity to propel the EU towards a future-proofed, efficient and sustainable building stock.

The 'smartness indicator'

As part of the tabled revisions to the Energy Performance of Building Directive (EPBD), the European Commission proposed the introduction of a smartness indicator.[4] To give value to smart buildings, the indicator must pull the market in the direction of smarter buildings, while also providing meaningful information on the potential of the building to prospective new tenants or buyers.

The characteristics set out in BPIE's definition of a smart building provide a vision of what smart buildings should entail.[3] The smartness indicator should reflect this by assessing those features required in a smart building. Features of the smartness indicator, recommended by BPIE, are shown in Figure 1. They should result from embedded and interconnected technical building equipment, components, storage and appliances steered and optimised through dynamic and self-learning control systems.

Capturing and promoting the benefits of smart buildings for building users and occupants, the energy system, energy markets, the economy and society as a whole must be the underlying purpose of introducing the smartness indicator. The wide range of benefits for the above parties include cost savings, optimal building environments for inhabitants, reduced pressure on energy markets, increased security of supply, lower demand for additional capacity, reduced air pollution and climate change mitigation.

Further suggestions from BPIE

Beyond a clear definition for the smartness indicator, BPIE makes further suggestions to ensure energy-efficient and healthy buildings. These include ramping up deep renovation, boosting the market uptake of nearly zero-energy buildings (nZEBs), training building professionals and phasing out inefficient technologies. BPIE suggests an increase in dynamic operability by empowering all consumers with smart

meters, optimising buildings with automation and controls and establishing system responsiveness. Occupants should be able to generate and self-consume renewable energy and demand response / dynamic pricing should be encouraged. There should also be immediate use or storage of renewable energy and synergies between smart buildings and electric vehicles. Some of these concepts are elaborated upon below.

Deep renovation

According to the Energy Performance of Buildings Directive (EPBD) Article 2a (Proposal), up to 90% of existing European buildings will still be in use in 2050. The majority is currently inefficient, making deep renovation of the building stock a necessity to meet the EU's climate and energy goals. A smooth transition to an energy-efficient and healthy building stock requires looking at several areas of legislation. Delivering greater energy efficiency and penetration of on-site renewable energy requires supportive policies in the EPBD and the Renewable Energy Directive.

The Commission's proposal for revising the EPBD is not sufficient to stimulate faster and deeper renovation. Fostering renovation activities requires striking a balance between creating tools that stimulate the financial market for energy renovations and defining mandatory requirements for better energy performance of public and commercial buildings. This means developing more comprehensive and user-friendly tools such as building renovation passports,[5] to better guide building owners and investors on how and when to invest in their buildings, and expanding existing legislation to require not only the renovation of central government buildings but of all public and commercial buildings.

A stronger link between the national renovation strategies and how Member States allocate the European Structural and Investment Funds would be beneficial, in terms of both ensuring an optimal use of funds but also to set out how these funds can be better used to leverage more private investments in energy renovations.

Nearly Zero Energy Buildings

According to the EPBD Article 9, all new buildings in the EU must be nearly zero-energy buildings (nZEBs), a level defined by national governments, by 2020. Up to now only 60% of Member States have legally specified their nZEB definition.[6]

Specific requirements setting maximum energy consumption needs of nZEBs are called for, to specify the final energy demand, the renewable share and nearby-produced energy. This should encourage buildings to have the lowest possible energy demand, with any remaining needs met by renewable energy.

Increasing skills

Strategic initiatives like BUILD UP Skills should seek to upskill the construction sector. The transformation of the construction sector through enhanced training and qualifications for property developers, architects, and the wider workforce is needed to build competence and awareness of innovative combined solutions.

Removing inefficient technologies

Heating systems are responsible for about 80% of the energy consumption of buildings.[7] Phasing out old and inefficient heating systems while guiding building owners towards renewable choices would increase the market for smart and low-CO_2 technologies.

Advice tools such as building renovation passports and Energy Performance Certificates (EPCs) would increase the visibility of its potential and encourage the uptake of smart buildings.

Increased dynamic operability

Smart buildings need to go beyond being energy efficient and healthy, and also recognise and react to users' and occupants' needs to optimise comfort, indoor air quality, well-being and operational requirements. Ensuring these needs requires looking at several areas of legislation, including the Energy Performance of Buildings Directive, the Electricity Directive and the Energy Efficiency Directive. Dynamic operability inside a building is intrinsically linked to the interaction of a building with the wider energy system.

Right - Figure 3: With 90% of the EU's current building stock due to still be standing in 2050, renovation is key. **Source:** Shutterstock.

Smart meters

Smart meters allow consumers and aggregators to have (near-) real time data on their energy use and to adapt their energy consumption according to the price of energy at any given time. The Commission's proposals for an Electricity Directive include the right for all consumers to request a smart meter. It is important that these can be easily operated by everyone and be exchangable across all appliances and systems. Standardisation, for example, building on the Smart Appliances Reference Ontology, should ensure compatibility and enable consumers to easily choose and swap technologies without impacting their interoperability. For commercial and tertiary buildings, requirements should encourage the installation of smart meters. To date, only Sweden, Finland, Italy and Estonia have completed their roll-out of smart meters.[1]

Automation and controls

Building automation and controls are an essential element of smart buildings. The EPBD obliges Member States to set minimum requirements for building optimisation, but implementation has been slow due to a lack of guidance. Minimum performance requirements for technical building systems should be more explicit.

Sharing renewable energy

Consumers should be able to generate, consume and store their own energy, as well as to sell it to the local electrical grid and heating network. This could open the door to millions of people to become active in the market. Self-consumption of renewables is currently hampered in several Member States, due to frequent changes to support schemes, unnecessary administrative burden and policies that hinder self-consumption.[8] Regulations and measures obstructing self-consumption and on-site or nearby renewable energy production such as high network tariffs, additional taxes or levies for connecting to the grid, should be lifted and administrative procedures simplified. A stable regulatory and financial framework for renewable self-consumption in buildings must be encouraged in every Member State.

On top of generating and using their own renewable energy, all consumers should be allowed to feed into the grid the electricity they generate, but do not use, and/or participate in demand-response activities. This means that hurdles to participation, such as exclusion of smaller players or high prices for grid connections, should be prevented. Significant barriers to demand-response continue to exist in most European countries.[1]

Participation of customers in demand response should be encouraged by Member States as it could deliver many benefits, not least by providing flexibility and additional capacity. The cost of balancing this resource and increased renewable energy generation is often cited as a reason for limiting this capacity. However, the European Commission estimates that increased demand-side flexibility could lead to savings of Euro5.6bn/yr from reduced back-up capacity, network and fuel costs.[9]

All consumers should also be able to have dynamic pricing contracts for their energy supply and network tariffs. This, alongside smart meters and controls, would allow them to benefit from adapting their energy consumption according to the price of energy at any given time. This could also include storage of renewable energy within the home, for example in water tanks or electric vehicles.

Summary

The proposed Clean Energy for All Europeans policy package is a unique opportunity to shape what the EU's building stock will look like in 2030. Missing the chance to set out a framework that enables and encourages efficient and smart buildings will come at a high cost for the EU in terms of global competitiveness, restrained investments and grid congestion. Legislation should avoid locking-in technological pathways by instead setting out a dynamic framework that supports increased interoperability within and between buildings, districts, vehicles and the energy system.

Buildings are an integral and elementary part of Europe's energy system and should play a pivotal role in the clean energy transformation of Europe. For buildings to be able to wield this responsibility as micro energy-hubs - empowering occupants to control their own renewable energy production and consumption; cutting energy bills; supporting the uptake of electrical vehicles; and facilitating better living and workplaces – they must first and foremost be energy efficient. The European building stock is the cornerstone of European society. It is time to be smart about it.

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The Cullimore Group

Women in construction at The Cullimore Group

According to the UK Office for National Statistics (ONS) and Construction News, of 2.3 million people working in the construction industry, only 296,000 are women. Two of these are 24-year-old Emma Wallis and 18-year-old Josie Barstow, both of whom operate 70t articulated dump trucks at Gloucestershire-based Cullimore Group, one of the UK's leading quarrying, haulage and aggregates companies...

Cullimore Group, which has been supplying the UK construction industry with locally-sourced materials for nearly a century, prides itself on managing its 100-strong workforce in a way that puts skills and capability before gender or stereotypical role-filling.

Managing Director Moreton Cullimore says, "Being a part of the team at The Cullimore Group means being valued for your skills, experience and potential. We're proud to adopt a strong team ethos in all that we do, jettisoning traditional stereotypes and focusing instead on skills and a positive can-do mind-set. If a person is committed, enthusiastic and hard-working, as Emma and Josie are, then they're already a good fit for our team; men or women, it really doesn't matter."

Emma started her career with the Group when she was 18, realising that a desk job wasn't for her. Her father, also an employee at Cullimore, encouraged her to pursue a career in the great outdoors by applying - and she's not looked back since.

Having mastered operating the CAT dump truck, she has also gone on to obtain her NVQ level 2 in driving the D6T bulldozer and the 962-loading shovel - both machines that weigh well over 20t.

Josie, meanwhile, started at The Cullimore Group in July 2017, having recently completed her final school exams. She hopes to match Emma's career progression. Instantly made to feel welcome by the team, Josie is continuing to receive specialist training from the company to ensure that she is fully equipped for the future.

"It's not often in the UK you see women working at the 'coal face' of a quarry and so I'm pleased that at Cullimore we are ringing the changes." says Moreton.

Working in a physically demanding environment with eight other male colleagues could appear daunting to some, not so for Emma and Josie, who

Right: Emma Wallis (right) and Josie Barstow (left) are two of the 296,000 women working in the UK construction sector. As the sector suffers from a shortage of staff it is vital to recruit more young people into the workforce, both men and women!

Statistics currently show that the UK construction sector must hire some 400,000 workers PER YEAR for the next five years if it is to meet growing demands...

Left: Emma Wallis has worked for The Cullimore Group since 2011. She is seen here at the wheel of a 70t CAT articulated dump truck.

frequently get stuck in with anything required of them.

"We're all here to support each other," says Josie. "OK, so sometimes, not being physically strong enough for some of the more extreme tasks means I draft in one of the guys to help. But it's no different from a man asking another man for assistance. At the end of the day, we're one team and we've got a job to do."

Ensuring that the workforce is equipped with the skills and knowledge necessary to be highly effective in their respective roles lies at the heart of The Cullimore Group's human resource ethos. This applies to all job-roles, both operationally and in back-office.

In UK construction, the pressing issue is that there simply aren't enough skilled workers to meet growing demands. Like cement, aggregates have a huge part to play in the house-building process. Quite simply without adequate volumes of aggregates, the voracious demands of house-building and infrastructure simply won't be met.

Statistics currently show that the sector must hire some 400,000 workers per year for the next five years if we are to meet growing demands, an issue that must first be addressed through education.

"Schools, colleges and universities must actively encourage all students to consider a career in construction - regardless of gender, age and any other archaic conventions that might hinder business," says Moreton. "At The Cullimore Group, we put capability before gender and stereotypical role types. If a woman can master quarry machinery as well as or better than a male counterpart, then it produces a positive, dynamic and productive workforce."

Challenging her preconceptions about working in the industry, Emma concludes. "Working at The Cullimore Group is definitely not how I'd imagined it at first. To be honest I thought it would be more of a challenge to fit in. However, the team are so welcoming that my concerns disappeared almost immediately. In terms of the job itself, I surprised myself, realising I was up for doing a lot more than I initially thought, not least manoeuvring a fully-laden articulated dump truck in tight circumstances!"

Left: Josie Barstow started working for The Cullimore Group in July 2017.

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TLT-Turbo inaugurates new Service-Workshop

On 8 November 2017, 50 guests from the industrial fan end-user community from 12 countries converged on fan expert TLT-Turbo GmbH (POWERCHINA Group), in Bad Hersfeld, Germany, to witness the inauguration of the company's expanded Service Workshop...

On 8 November 2017, 50 specially invited guests of TLT-Turbo came to witness the inauguration of the company's expanded Service-Workshop at Bad Hersfeld, Germany, which offers customers 'superior full service.' Guests were also able to meet key company personnel in order to discover the most recent developments. These include:

- Expansion of the service workshop from 3000m^2 to approximately 6000m^2;
- New space employed for:
  - Newly structured and enlarged quality assurance section;
  - Additional manufacturing and assembly section (assembly largely for Jet Fans, Metro Fans and MVR)
  - Additional storage capacity with a total of 450 storage spaces;
- Test stand for fan performance and mechanical tests.

The advantages of the expansion are reportedly more flexibility, space for handling large and small components and generally more efficient material handling through additional pallet spaces (450 units). Separate areas for dismantling and final assembly were also created, as well as optimisation of in-plant routes and transport. In addition to the extension of the blasting, cleaning and painting process as well as of other process machinery, the company's balancing machine is a key investment. It can balance rotors of up to 50t in weight. Furthermore, an online tool has been created in which customers can clearly follow the processing status of a rotor repair.

The company reports that, with the newly-equipped workshop, it is meeting increased market requirements regarding throughput times, quality, costs, traceability and transparency, enabling it to be as close to the customer as possible.

Three levels of rotor repairs are offered, even for equipment manufactured by third-parties:

- Rapid inspections;
- Standard inspections;
- Diagnosis-oriented inspections.

1: A view of TLT-Turbo's recently expanded Service-Workshop in Bad Hersfeld.

2: The new Schenck Rotec balancing machine can balance fans up to 50t in weight. It represents a major investment for TLT-Turbo.

3: An audience member asks a question.

4: The blade machining centre.

5: The CNC vertical lathe machine.

6: Christian Kosack, head of supply chain management at TLT-Turbo, points to special wear protection applied to the customer's fan.

7: Flensh bending machine for impellers up to 3.6m in diameter and of thickness up to 12mm.

8: Welding turn table for impellers of up to 4.5m in diameter.

9: A completed fan leaves the Bad Hersfeld facility on its way to a customer.

Presentations

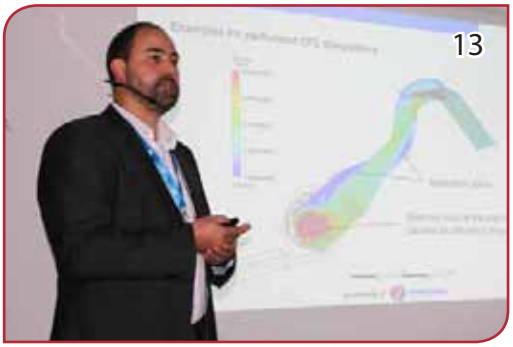
The proceedings encompassed a series of focused presentations introduced by Christian Kosack, Head of Supply Chain Management at TLT-Turbo. Rainer Redinger, Managing Director, first gave the audience an introduction to the TLT-Turbo Fan Group. He emphasised the company's proven technology - representing high product quality - plus maximum research and development and competitive manufacturing, which enables it to offer high-end customer-specific solutions. It can do this on a financially sound and 'reliable long-term partner' basis, as part of its parent company, Powerchina. All this with the benefit of local presence worldwide. The parent company has a Euro38bn turnover and is placed at 190 on the list of Global Fortune 500 companies.

10: Rainer Redinger, Managing Director of TLT-Turbo, introduced the group to the audience.

11: Matthias Adamy, Sales Director After-Sales-Service speaking during the presentations.

Then Manfred Sippel explained the different service options, Rapid Inspections (approximately four weeks with an eight month lead-time), Standard Inspections (approximately four months with an eight month lead-time) and Diagnosis-Based Inspections. These options generated an interesting lively debate among the industry guests.

12: Manfred Sippel, Sales Manager, gives a presentation to the audience.

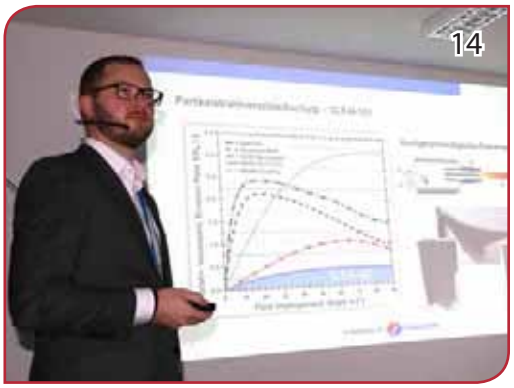


13: Jörg Schmidt presents 'Rotor blade adjustment for control drives and proportioning valves.'

This was followed by a workshop tour, split into three groups. This gave participants the opportunity to witness in detail the various works' sections, their machinery and layout of the expanded facilities.

Presentations continued after the tour, with Patrick Baumgärtner contributing from one of his own areas of specialisation 'Thawing point and low temperature corrosion.' His presentation was followed by Jörg Schmidt, on the topic of 'Rotor blade adjustment for control drives and proportioning valves'. Last but not least was Dr Steven Diehl, Head of research and development, who gave his case-study results on CFD simulations, one of which overcame an efficiency drop of 25%!

In addition to the upgraded Bad Hersfeld facility, the company's service workshops in the USA, South Africa and China and the new service workshop opening in India in 2018 reportedly offer the same level of service for all fan types. A final round of discussions completed the day's proceedings.



14: Patrick Baumgärtner, wear and corrosion specialist at TLT-Turbo.

Global Cement staff

14th TÇMB Technical Symposium: In pictures

The 14th *International Technical Seminar & Exhibition*, organised by the Turkish Cement Manufacturers Association (TÇMB) took place on 10 - 13 October 2017 in Antalya, Turkey. It attracted 576 participants from Turkey and around the world. Here, *Global Cement* presents a photographic review of the event. The 15th edition of the event will take place once again in Antalya in 2019.

1: Discussions on the DAL Group stand.

2: Cameras visited SICK AG's stand for high-level introductions during the opening ceremony.

3: TÇMB Board Chairman M. Sefik Tüzün seen giving his keynote speech.

4: Giuseppe Schlitzer of the Italian Association of Cement Manufacturers during his presentation.

5: KHD Humboldt Wedag's Norbert Streit presented a paper on the PYROCLON® low NO_x calciner installed at Sönmez Çimento.

6: Matthias Schilling of Schenck Process addressed the audience with his LOGiQ® presentation.

7: Ugras Akay of FONS Technology spoke about the company's work on Nuh Cement's plant line 1 upgrade.

8: Jürgen Lauer of BWF Envirotec gave a presentation on filter media.

9: All smiles on the Fives stand.

10: Roland Martini and Olga Schweitzer of vertical roller mill producer Gebr. Pfeiffer.

11: Yury Mitsevich (left) Mustafa Özaskan (right) of Mühlen Sohn on the company stand.

12: The team from vertical roller mill guru Loesche.

13: Markus Horstkötter of cement bagging experts Haver & Boecker.

14: The team from burner specialists Unitherm Cemcon.

15: Left to right: Roland Martini (Gebr. Pfeiffer), Dirk Rünker (Venti Oelde), Bjoern Heumann (Korfez GmbH),Rüdiger Henneböhl (KorfezGmbH), Berthold Bussieweke (Thorwesten Vent) and Bernd Lübbert (Claudius Peters).

16: Members of the CETA team. From left to right: Mustafa Borckbakcan, H Cüneyt Borckbakcan and Zeynep Çoruh.

17: Nicolas Gouez fitting a kiln gear drive virtual reality headset to a visitor on the CMD Gears' stand.

18: Martin Engineering happily pose for the camera!

19: Left to right: Mustafa Orhun Çavdar (Somer International), Tim Hamer (Vecoplan) and Ahmet Somer, (Somer International) on the Vecoplan stand.

20: Left to right: Mustafa Orhun Çavdar (Somer International), Martin Burstrom (Brokk AB), Daniel Chavis (Bricking Solutions), Ahmet Somer (Somer International) and Tahir Abbas (Cinar Ltd).

21: Left to right: Oliver Langenstein, Peter Muller, Christian Spättmann of AUMUND Group.

22: Left to right: Bernd Lübbert (Claudius Peters), Enis Bostanci (Sintek) and Ansgar Reismann (Claudius Peters) on the Claudius Peters Projects stand.

23: The Calderys team during a break. From left to right: Michael Louen, Haktan Ilce and Dr Volker Wagner.

24: A large delegation from Danish cement plant engineering company FLSmidth are all smiles on the company's impressive stand.

25: Frank Brannvoll from Cembureau, the European cement association.

Colombia: Argos, Cemex and Holcim fined US$68m

The Superintendent of Industry and Commerce (SIC) has fined Cementos Argos, Cemex and Holcim and six senior managers US$68m for fixing the price of Ordinary Portland Cement. The fine covers behaviour by the companies between January 2010 and December 2012. SIC's investigation discovered that collusion between the cement producers artificially increased the price of cement by 30% despite inflation being 9% during the period.

Cementos Argos responded to the sanction by saying that it rejected the fine and decision by SIC. Following an earlier statement in October 2017 it once again criticised SIC's methods. According to Reuters, both Holcim and Cemex disagreed with the finding and they said they would take legal action against it.

Colombia: New construction waste subsidiary for Argos

Cementos Argos has set up a subsidiary, Granulados Reciclados de Colombia (Greco), to recycle construction material waste. The new company's operations will be based at its Cota plant in Cundinamarca, according to La Republica newspaper. The operation is expected to process over 1Mt/yr of construction waste material. The company is a joint operation with local industrial conglomerate Fanalca and South Korean lighting equipment manufacturer Daeyang.

Argentina: Delays amid high demand

Cement plants are reportedly requiring 48 hours notice to process orders due to major growth in the construction sector driven by infrastructure development. Due to this, materials such as cement and concrete are facing shortages. Prices for building materials have risen by around 40%.

Norberto Ladea, the commercial director of Holcim Argentina, said that the company has expanded its production by approximately 13% year-on-year in 2017 with a cement production capacity of 4.8Mt/yr. It is currently planning its investment to bolster output in 2018.

Bolivia: COBOCE mill order for FLSmidth

Cooperativa Boliviana de Cemento, Industrias y Servicios (COBOCE) has ordered an OK 43-4 vertical cement mill from FLSmidth for its Irpa Irpa plant near Cochabamba. The unit will have a production capacity of 130t/hr. The order includes a complete range of equipment from mill feeding bins, grinding and cement transport. FLSmidth will also supply equipment from its product brands, such as planetary gear units from FLSmidth MAAG Gear, fabric filters from FLSmidth Airtech and a control system and plant automation from FLSmidth Automation.

"We are proud to deliver the first cement vertical roller mill to COBOCE, making it the third out of five Bolivian suppliers to choose our cement vertical roller mill technology. This order underlines FLSmidth's strong position in Bolivia," said Per Mejnert Kristensen, Group Executive Vice President, Cement Division.

Chile: New director for Cementos Bío Bío

Cementos Bío Bío has appointed Katia Trusich as director and member of the Directors Committee. Her appointment follows the resignation of André Roberto Leitão. Trusich has held a number of private and public sector roles, including working as the Under Secretary of Economics for the Chilean government between 2014 and 2016. Most recently she has been the Corporate Affairs Manager for CGE.

Chile: Briones family to buy Bío Bío stake

The Briones family has decided to acquire another 13.1% stake in local cement producer Cementos Bío Bío from Brazil's Votorantim for US$45.5m. The family thus intends to increase its shareholding to 39.5%. Votorantim would be left without an interest in the company if the deal goes ahead.

Canada: Association supports Provincial emissions schemes

The Cement Association of Canada has announced its support for emission reduction schemes in two Provinces. The Alberta provincial government has released its over-arching policy framework for the Output-based Allocation System and the Ontario government has run its fourth and final cap-and-trade auction before formally linking with California and Quebec in 2018.

The introduction of an Output-based Allocations (OBA) System in January 2018 will transition Alberta's regulated facilities from the current Specified Gas Emitters Regulation (SGER). The OBA will set an industry specific performance benchmark for emissions-intensive, trade-exposed industries (EITEs), which includes the province's two cement plants, Lafarge in Exshaw and Lehigh in Edmonton. The benchmark combined with output-based allocations is intended to drive best-in-class performance while maintaining the competitiveness of industries in Alberta.

Ontario raised US$330m, bringing total proceeds from the system to date to around US$1.5bn. The proceeds are to be reinvested into initiatives that will further reduce greenhouse gas emissions.

"From the cement industry's perspective, the framework demonstrates that the Alberta government understands the pressures EITE industries face to remain competitive in the global market. Climate change is the single most important issue facing our society today and Alberta's Climate Leadership Plan lays the foundation for industries to play a major role in assisting government in meeting its 2030 targets and transitioning to a low carbon economy," said Michael McSweeney, President and chief executive officer (CEO) of the Cement Association of Canada.

With respect to Ontario he added that the Canadian cement industry believes that cap-and-trade systems are the most effective means of delivering environmental results while putting a price on carbon. "Linkage with California and Quebec is also an important feature of the Ontario system: the broader the market, the more likely it will be that price will reflect the true incremental cost of reducing emission," said McSweeney.

Canada: Lafarge invests to head off tyre burning objections

As it awaits industrial approval from the Province to burn tyres at its Nova Scotia cement plant, Lafarge Canada says it has spent US$830,000 to install emissions monitoring systems. The company says its new equipment measures plant emissions such as sulphur dioxide, nitrogen oxides, carbon monoxide, carbon dioxide, oxygen and total hydrocarbons every 10 seconds.

Rob Cumming, Lafarge's environment director, says the company's proposed one year pilot project at its Brookfield plant will allow it to gather the scientific evidence needed to assure the public that it is safe to use scrap tyres as a replacement for coal.

In October 2017, the Environment Department said it was reviewing the company's application and would make a decision on the project within 60 days. The project has drawn criticism from residents near the plant, environmental groups and Nova Scotia's NDP, which has called on the Liberal government to ban tyre burning.

US: Coal hopper fire at GCC Dacotah

Rapid City Fire Department crews quickly extinguished a potentially dangerous fire inside a coal hopper at the GCC Dacotah Cement Plant on 21 November 2017.

The plant suffered little damage and no injuries were reported. According to fire department spokesman Jim Bussell, crews attended the plant at 07:40.

The first crew found dark smoke coming from inside a building containing the coal hopper. Due to the inherent volatility of coal dust, the firefighters made a careful entry into the building and quickly dealt with the fire. Bussell said that GCC Dacotah's comprehensive emergency response plan, implemented after a review by both the cement plant and fire department officials in mid 2016, helped to minimise the effects of the fire. "This open dialogue and communication was key to a safe, quick response and resolution of the incident," Bussell said in a release. He added that GCC Dacotah expected no disruption to plant operations because the fire was in a part of the plant that is in the middle of a US$90m expansion project. The cause of the fire remains under investigation.

US: Rexnord introduces Smart Coupling products

Rexnord has added Smart Coupling to its portfolio of products that use its industrial internet of things (IIoT) Smart Tag. The mechanical components manufacturer says that its range of connected products can monitor equipment parameters providing operational analytics that can be used to increase system performance. Its coupling and shaft products, including elastomeric, disc, grid and gear coupling products as well as torque limiters, are used in a variety of applications across industries including the material handling sector.

Chile: Melon fighting Chilean headwinds

Cementos Melon has recorded a 56.8% drop in its profit to US$7.8m in the three quarters to 30 September 2017. The company said that a drop in sales had been partly mitigated by greater focus on margins and operational efficiency gains. Its revenue fell by 13.6% to US$210m.

Chile: Cemento Polpaico flips to a loss

Cemento Polpaico has reported losses of US$3.58m in the first nine months of 2017. This compares very unfavourably with the company's profit of US$6.5m in the same period of 2016.

The firm recorded revenues from ordinary activities of US$151m, a 11.4% reduction compared to the first nine months of 2016 when it took in US$170.4m.

Peru: Sales rise in October 2017

A total of 925,000t of cement was sold in Peru in October 2017, an increase of 12.1% compared with sales in October 2016 and 3.3% above sales in September 2017, according to data from Asocem. Cement production stood at 922,000t, 6.3% higher than October 2016 and 4.4% higher than September 2017. Domestic sales stood at 873,000t, 5.8% higher than in October 2016 and 4.4% compared to September 2017. Cement production hit 8.19Mt in the first 10 months of 2017, 2.1% down year-on-year. Domestic cement sales reached 7.85Mt in the first 10 months of 2017, 1.5% down year-on-year. Total sales, including exports, reached 8.15Mt, 1.9% down year-on-year.

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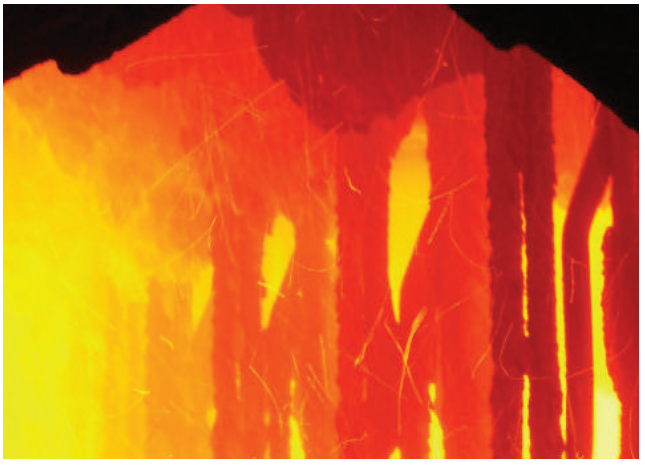

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Peter Edwards, Global Cement Magazine

The cement industry of South America

The countries of South America have different levels of economic development and cement industries of vastly different sizes. Brazil, which is not covered in this review, has a cement sector that is around as large as the rest of the continent combined. By contrast, French Guiana only has a single grinding plant. Here we review the capacities, production trends, recent plant news and other notable events for Argentina, Bolivia, Chile, Colombia, Ecuador, French Guiana, Guyana, Paraguay, Peru, Suriname, Uruguay and Venezuela.

Argentina

Argentina has 14 integrated cement plants and a further three cement grinding plants. They share a combined capacity of 20.3Mt/yr, according to the *Global Cement Directory 2018*. This is enough to give Argentina South America's second-largest cement industry after that of Brazil.

Producer breakdown

The largest manufacturer of cement in Argentina is Loma Negra, the local subsidiary of Brazil's InterCement. It operates 8.2Mt/yr of integrated capacity across seven plants, as well as 0.6Mt/yr of grinding capacity at a plant in Ramallo. Its 8.8Mt/yr constitutes around 43% of national capacity.

Holcim Argentina, part of LafargeHolcim, is the second-largest producer by installed capacity. It has 4.1Mt/yr of integrated cement capacity at three sites, plus 1.7Mt/yr of grinding capacity at a further two. It has around 28% of national capacity.

Cementos Avellaneda, a joint-venture between the Spanish Group Cementos Molins and Brazil's Votorantim, is the third-largest producer of cement by installed capacity in Argentina. It operates 4.8Mt/yr of cement capacity at two integrated plants and one grinding plant.

In June 2016 Cementos Avellaneda announced a US$189m upgrade at its San Jacinto grinding plant. The capacity will increase to 1.0Mt/yr from 0.3Mt/yr, taking Cementos Avellaneda's total to 5.6Mt/yr. The upgrade will be completed by the start of 2019.

The smallest and final player in the Argentinian cement market is Petroquimica Comodoro Rivadavia (PCR), which operates two integrated cement plants and has a total capacity of 0.9Mt/yr.

Recent production trends

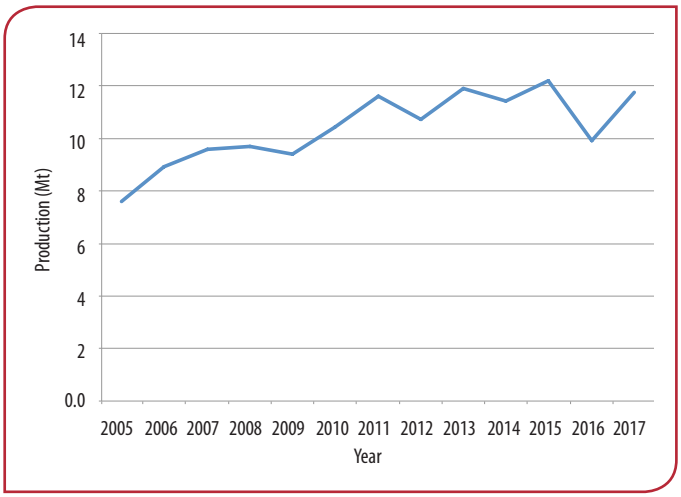
According to the Asociacion de Fabricantes de Cemento Portland (AFCP), cement production fell by 10.7% year-on-year in Argentina during 2016, from 12.19Mt in 2015 to 10.89Mt in 2016. However, production rose significantly in the first three months of 2017 to 2.7Mt from 2.56Mt a year earlier. March 2017 was reported to be the best ever for the sector, with a 15.5% year-on-year improvement. In the first six months of 2017 cement production rose by 8.4% to 5.51Mt from 5.08Mt. July 2017 recorded a massive 18.8% year-on-year increase in cement production to 1.01Mt.

The AFCP has so far reported data for the first 11 months of 2017. It reports cement production of 10.7Mt, an 8.5% year-on-year rise. If the data for December 2017 shows a similar trend, Argentina will have produced around 11.86Mt of cement in 2017, regaining almost as much ground in 2017 as it had lost in 2016.

Imports were an increasingly important part of the cement picture in Argentina during 2017. Holcim Argentina reportedly planned to import 0.25Mt of clinker between May 2017 and April 2018. Bolivia's

Country	Active capacity (Mt/yr)			Number of active plants		
	Integrated	Grinding	Total	Integrated	Grinding	Total
Argentina	17.7	2.6	**20.3**	14	3	**17**
Bolivia	4.9	0.2	**5.1**	8	2	**10**
Chile	7.0	4.1	**11.1**	5	10	**15**
Colombia	14.5	2.6	**17.1**	15	4	**15**
Ecuador	4.0	0.9	**4.9**	5	1	**6**
French Guiana		0.1	**0.1**		1	**1**
Guyana	0.5		**0.5**	1		**1**
Paraguay	1.0	1.0	**1.4**	1	2	**3**
Peru	11.4		**11.4**	8		**8**
Suriname		0.5	**0.5**		1	**1**
Uruguay	1.1	0.5	**1.6**		1	**1**
Venezuela	15.4		**15.4**	11		**11**
TOTAL	**77.5**	**12.5**	**89.4**	**68**	**25**	**89**

Right - Table 1: South America cement capacity and plant totals. **Source:** *Global Cement Directory 2018.*



Left - Figure 1: Argentinian cement production, 2005 - 2017. 2017 value is an estimate based on real January - November 2017 data, plus estimated value for December 2017 based on year-on-year change (2016-2017) of first 11 months. **Source:** AFCP.

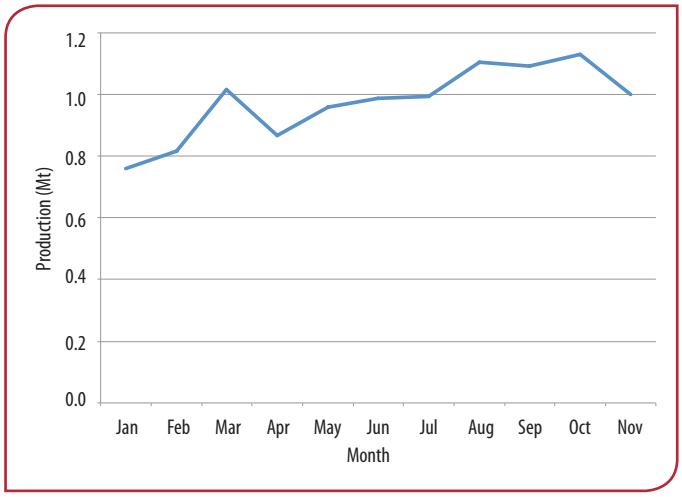
La Calera and Olavarría cement plants in October 2017. US$200m was earmarked to increase the production capacity of the La Calera plant in San Luis to 1.0Mt/yr from 0.7Mt/yr by the second half of 2019. US$30m will be used to raise the Olavarría plant's capacity by 0.3Mt/yr to 2.7Mt/yr by 2019.

Itacamba sent 4000t of cement to Argentina in early 2017 and was reported to be about to send the same amount again in mid-November 2017.

Recent news

November 2017: Loma Negra ran an initial public offering in November 2017. It had aimed to generate up to US$800m from the flotation but ended up raising more than US$1bn.

Left: Concrete being poured in Buenos Aires, Argentina in October 2017.



Left - Figure 2: Argentinian cement production in 2016. **Source:** AFCP.

Bolivia

Bolivia has eight integrated cement plants and two grinding plants that share a total capacity of 5.1Mt/yr. The industry is dominated by local producers.

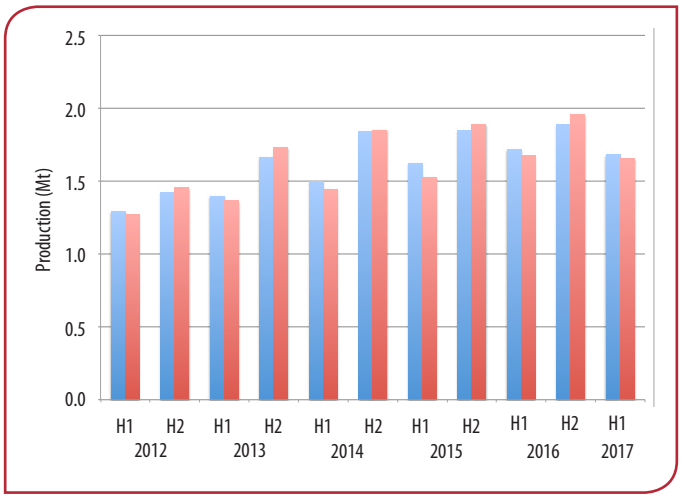
Producer breakdown

The largest cement producer in Bolivia is Sociedad Boliviana de Cemento (SOBOCE), which has three integrated plants and one grinding plant. It has a total production capacity of 1.5Mt/yr. The second-largest producer in Bolivia is Fabrica Nacional De Cemento (FANCESA), which operates an integrated 1.0Mt/yr plant in Sucre.

Other producers active in the market are Cooperativa Boliviana de Cemento, Industrias y Servicios (COBOCE) and Empresa Minera Industria, which operate integrated plants of 0.3Mt/yr and 0.1Mt/yr respectively. Itacamba Cemento, a Votorantim subsidiary, also operates a grinding plant close to the Brazilian border and a 0.9Mt/yr integrated plant that

October 2017: Loma Negra has signed a deal to buy renewable energy from local power company Geneia for a 20-year period starting in January 2018. The agreement will include energy generated by the Parque Eólico Rawson wind farm, which had been due to complete a 24MW expansion in 2017.

October 2017: Cementos Avellaneda announced plans to spend US$230m towards upgrading its



Right - Figure 3: Bolivian cement production by half year, 2012 - 2017 (H1). **Source:**

came online in Yacuses in late 2016. It was inaugurated in February 2017.

Bolivia will gain further cement plants in the coming years. The government-owned Empresa Publica Productiva Cementos de Bolivia (ECEBOL) is due to start construction of a 1.3Mt/yr plant in Chiutara, Potosí, in earnest during the first quarter of 2018. It had broken ground on the project in August 2017 but has faced issues over the future water supply at the site. ECEBOL is also building a 1.3Mt/yr integrated plant at Jeruyo, Caracollo, a project that was announced in November 2016.

In addition, the mining industry chamber in the state of Tarija has asked governor Adrian Oliva to build a new cement plant in Mendez Province. The proposal follows confirmation by the National Geology and Mining Technician Service (Sernageomin) of 'large' limestone deposits.

Recent production trends

Annual cement sales in Bolivia have been growing consistently since 2001. Financial services company Pacific Credit Rating has placed average annual sales growth at 7.72% from 1998 to 2016. In 2016 sales reached 3.7Mt. Figure 3 shows a continuation of this trend, although the first half of 2017 was weaker than 2016. COBOCE blamed the reverse in 2017 on reduced local government spending on infrastructure projects and poor weather. In October 2017 COBOCE was still expecting sales to grow by 6-8% as a whole for 2017.

Recent news

December 2017: Cooperativa Boliviana de Cemento, Industrias y Servicios (COBOCE) ordered an OK 43-4 vertical cement mill from FLSmidth for its Irpa Irpa plant near Cochabamba in December 2017. The unit will have a production capacity of 130t/hr. The order includes a complete range of equipment from mill feeding bins, grinding and cement transport. FLSmidth will also supply equipment from its product brands, such as planetary gear units from FLSmidth MAAG Gear, fabric filters from FLSmidth Airtech and a control system and plant automation from FLSmidth Automation.

July 2017: Fábrica Nacional de Cemento (Fancesa) underwent a tendering process to upgrade its packing unit at its cement plant in Cal Orcko. Haver & Boecker, FL Smidth Ventomatic, Claudius Peters and Beumer Latin America all submitted bids. The project includes a new cement silo, new bagging machinery and a mechanised loading system.

July 2017: Cement producers called for a ban of cement imported from Peru in July 2017. The producers met and then asked the government for the measure in order to protect the local industry. They suggested that import tariffs be raised at the very least.

June 2017: Itacamba's Yacuses plant installed several electric motors from Brazil's WEG in the first half of 2017. The scope of supply included W22 IP66 low voltage motors and medium voltage slip ring motors with a brush lifting system for continuous operation. Although WEG did not specify the exact application of the motors, such products are usually used in mill drives, crushers and fans at cement plants.

Chile

Chile has five integrated cement plants with a total capacity of 7.0Mt/yr, plus 10 grinding plants that provide a further 4.1Mt/yr. This gives it a total capacity of 11.1Mt/yr.

Producer breakdown

The largest cement producing group in Chile is Hurtado Vicuña Group. It owns a controlling 54.3% stake in Cemento Polpaico, which has one 2.3Mt/yr integrated plant and two grinding plants that share a total capacity of 1.1Mt/yr. Cementos Bicentarenario (BSA), which operates three grinding plants (1.5Mt/yr total) is also part of Hurtado Vincuña via its subsidiary Inversiones Caburga. In total the group has its hand in 4.9Mt/yr of cement capacity in Chile, around 44% of the national total.

The second-largest and oldest cement producer in the Chilean cement market is Cementos Bío Bío, (3.5Mt/yr) which operates three integrated plants (3.2Mt/yr) and one grinding facility (0.3Mt/yr). In July 2017 it announced that it would stop making clinker at its 0.8Mt/yr integrated plant at Talcahuano due to the relatively high cost of producing locally, compared to importing clinker from Asia.

Cementos Melón (2.1Mt/yr) is the third-largest producer in Chile, with one 1.5Mt/yr integrated plant and 0.6Mt/yr of grinding capacity that is split evenly across two sites.

The remaining two cement producers in Chile operate grinding plants only. Hormigones Transex and Cementos La Union each operate a single grinding facility, with capacities of 0.4Mt/yr and 0.2Mt/yr respectively.

Left: Cementos Argos is a significant player in the Colombian and wider South and North American markets. **Source:** Cementos Argos' website.

Recent news

November 2017: Cementos Mélon reported a 56.8% drop in its profit to US$7.8m in the first nine months of 2017 on the back of a 13.6% drop in revenue to US$210m. It said that the results came despite a focus on maintaining margins and increasing its operational efficiency.

November 2017: Cemento Polpaico saw a loss of US$3.6m in the first nine months of 2017. It reported a profit of US$6.5m in the same period of 2016.

November 2017: The Briones family reported that it would increase its stake in Cementos Bío Bío by acquiring a 13.1% stake from Votorantim for US$45m. Votorantim would no longer have a stake in the company if the deal is completed.

Colombia

Colombia has the third-largest cement sector in South America after Brazil and Argentina. It has 14 active integrated plants (14.5Mt/yr) and four grinding facilities (2.6Mt/yr), giving it a total of 17.1Mt/yr. It also has a recently-closed 0.3Mt/yr integrated plant, two integrated plants that are under construction (1.0Mt/yr each) and one that is undergoing expansion from 1.4Mt/yr to 2.4Mt/yr. Assuming that all of the extra capacity comes online, Colombia will increase its capacity to 20.1Mt/yr.

Producer breakdown

Cementos Argos is the largest producer of cement in Colombia. It is one of the few non-Brazilian companies from South America to own cement facilities in other countries. In its portfolio are facilities in the United States, French Guiana, Haiti, Honduras, Panama, the Dominican Republic and Suriname.

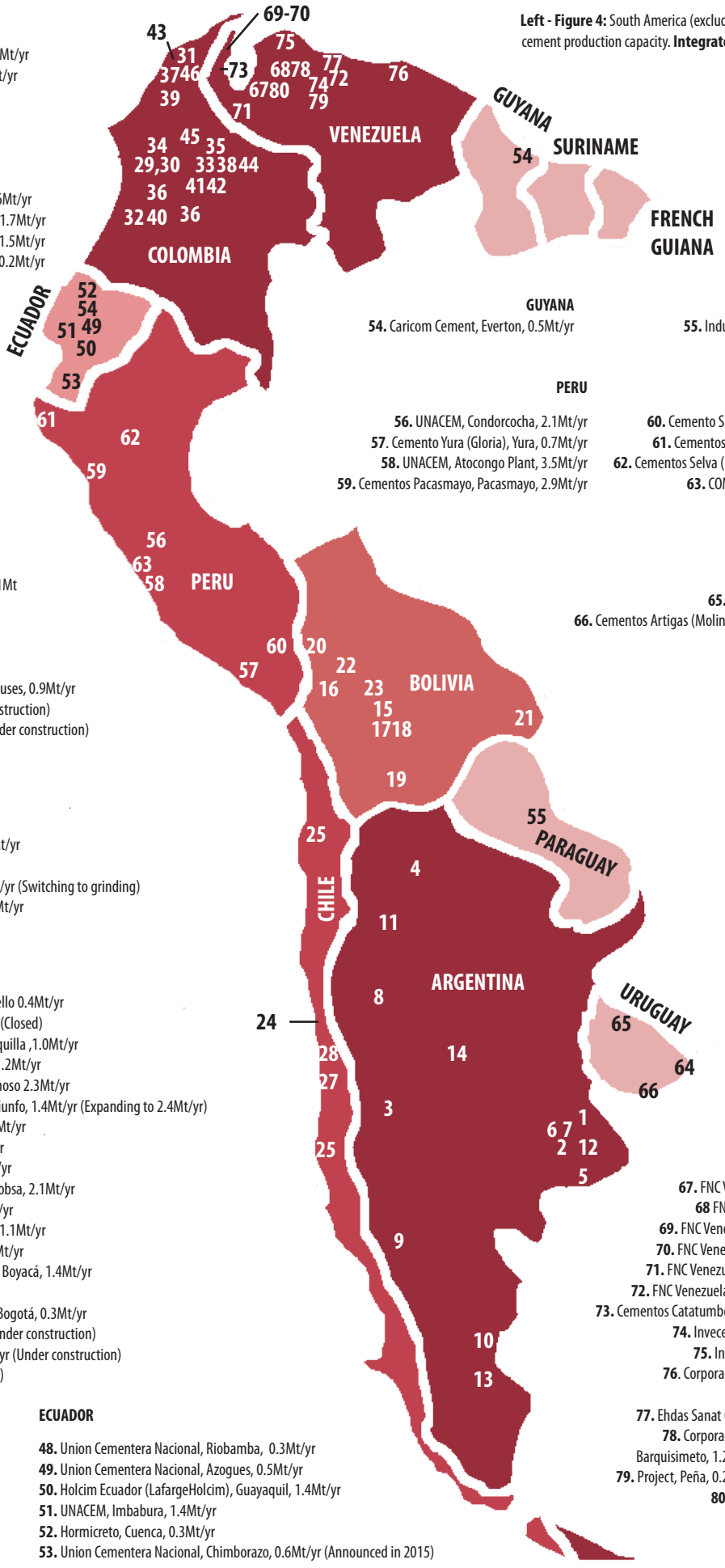
In Colombia Cementos Argos operates 10 plants that share a total capacity of 11.3Mt/yr, enough to give it 65% of the national market. The bulk of its installations are integrated facilities, with just one 0.2Mt/yr grinding plant in its portfolio. It is in the process of expanding the capacity of its Rioclara plant from 1.4Mt/yr to 2.4Mt/yr.

Cementos Argos' sales revenue and earnings fell in the first nine months of 2017 due to poor performance in Colombia. Its sales revenue fell by 1.3% year-on-year to US$2.14bn from US$2.17bn in the same period of 2016. Its earnings before interest, taxation, depreciation and amortisation (EBITDA) fell by 16.8% to US$352m from US$424m. However, its cement sales volumes rose by 15.4% to 12.2Mt from 10.5Mt. In the first half of 2017 its net profit fell by 84.5% to US$19.3m, rather than the US$124.4m it posted during the first half of 2016. It had made a loss of US$15.6m in the first quarter of the year.

Cemex is the second-largest producer by installed capacity in Colombia, with 4.4Mt/yr of capacity spread across two integrated (3.0Mt/yr) and two grinding facilities (1.4Mt/yr). It is in the process of building two further integrated plants in the country, each with a headline capacity of 1.0Mt/yr. In theory their commissioning would increase Cemex's local capacity to 6.4Mt/yr. However, its project at Maceo has been dogged by delays and controversy. As of March 2017 it announced that it would run the plant at just 0.25Mt/yr having failed to overturn the annulment of its environmental permits in late 2016.

Other producers that operate in the Colombian market include LafargeHolcim, which has one 2.1Mt/yr integrated plant. It has announced that it would build a 0.5Mt/yr grinding plant in November 2016. It is expected that this will come online in the first quarter of 2018. A 1.0Mt/yr grinding plant is operated by Ultracem, and Procemcol opened its 0.2Mt/yr integrated plant in September 2016. Cementos Molins is also in the process of planning a 1.3Mt/yr plant in Colombia. It is due to come online in 2019.

Left: The main square in Bogotá, Colombia.



Left - Figure 4: South America (excluding Brazil), colour-coded by cement production capacity. **Integrated cement plants shown.**

- >15Mt/yr
- 10-15Mt/yr
- 5-10Mt/yr
- 2.5-5Mt/yr
- 0-2.5Mt/yr

ARGENTINA

1. Cementos Avellaneda, San Jacinto, 2.1Mt/yr
2. Cementos Avellaneda, Olavarria, 2.4Mt/yr (Expanding to 2.7Mt/yr)
3. Holcim Argentina (LafargeHolcim), Capdeville, 0.7Mt/yr
4. Holcim Argentina (LafargeHolcim), Puesto Viejo, 1.0Mt/yr
5. Loma Negra (InterCement), Barker, 1.6Mt/yr
6. Loma Negra (InterCement), Olavarria, 1.7Mt/yr
7. Loma Negra (InterCement), Olavarria, 1.5Mt/yr
8. Loma Negra (InterCement), San Juan, 0.2Mt/yr
9. Loma Negra (InterCement), Zapala, 0.4Mt/yr
10. PCR, Comodoro, 0.4Mt/yr
11. Loma Negra (InterCement), Catamarca, 1.8Mt/yr
12. PCR, Pico Truncado, 0.5Mt/yr
13. Loma Negra (InterCement), Sierras Bayas, 1.0Mt/yr
14. Holcim Argentina (LafargeHolcim), Malagüeño, 2.4Mt/yr

BOLIVIA

15. COBOCE, Irpa Irpa, 0.3Mt/yr
16. Empresa Minera Industrial, Oruro, 0.1Mt
17. FANCESA, Cal Orcko, Sucre, 1.0Mt/yr
18. SOBOCE, Emisa, 0.2Mt/yr
19. SOBOCE, El Puente, 0.2Mt/yr
20. SOBOCE, Viacha, 0.9Mt/yr
21. Itacamba Cemento (Votorantim), Yacuses, 0.9Mt/yr
22. ECEBOL, Jeruyo, 1.3Mt/yr (Under construction)
23. ECEBOL, Cutara, Potosí, 1.3Mt/yr (Under construction)

CHILE

24. Cemento Melón, La Calera, 1.5Mt/yr
25. Cementos Bío Bío, Antofagasta, 0.7Mt/yr
26. Cementos Bío Bío, Curico, 1.7Mt/yr
27. Cementos Bío Bío, Talcahuano, 0.8Mt/yr (Switching to grinding)
28. Cemento Polpaico, Cerro Blanco, 2.3Mt/yr

COLOMBIA

29. Cementos de Cairo (Argos), Monjtebello 0.4Mt/yr
30. Cementos de Caldas, Neira, 0.3Mt/yr (Closed)
31. Cementos del Caribe (Argos), Barranquilla ,1.0Mt/yr
32. Cementos del Valle (Argos), Yumbo, 1.2Mt/yr
33. Cementos Paz del Rio (Argos), Sogamoso 2.3Mt/yr
34. Cementos Rioclaro (Argos), Puerto Triunfo, 1.4Mt/yr (Expanding to 2.4Mt/yr)
35. Cemex Colombia, Bucaramanga, 0.2Mt/yr
36. Cemex Colombia, Caracolito, 2.8Mt/yr
37. Colclinker (Argos), Cartagena, 1.4Mt/yr
38. Holcim Colombia (LafargeHolcim), Nobsa, 2.1Mt/yr
39. Tolcemento (Argos), Toluviejo, 0.9Mt/yr
40. Cementos San Marcos (Argos), Valle, 1.1Mt/yr
41. Cementos Tequendama, Suesca, 0.3Mt/yr
42. Cementos Argos, Sogamoso, Bogotá, Boyacá, 1.4Mt/yr
43. Cementos de Oriente, Malambo
44. Productora de Cemento, Sogamoso, Bogotá, 0.3Mt/yr
45. Cemex Colombia, Maceo,1.0Mt/yr (Under construction)
46. Cemex Colombia, Magdelena,1.0Mt/yr (Under construction)
47. Cementos Molins, 1.2Mt/yr (Planned)

ECUADOR

48. Union Cementera Nacional, Riobamba, 0.3Mt/yr
49. Union Cementera Nacional, Azogues, 0.5Mt/yr
50. Holcim Ecuador (LafargeHolcim), Guayaquil, 1.4Mt/yr
51. UNACEM, Imbabura, 1.4Mt/yr
52. Hormicreto, Cuenca, 0.3Mt/yr
53. Union Cementera Nacional, Chimborazo, 0.6Mt/yr (Announced in 2015)

GUYANA

54. Caricom Cement, Everton, 0.5Mt/yr

PARAGUAY

55. Industria Nacional del Cemento, Malagüeño, 1.0Mt/yr

PERU

56. UNACEM, Condorcocha, 2.1Mt/yr
57. Cemento Yura (Gloria), Yura, 0.7Mt/yr
58. UNACEM, Atocongo Plant, 3.5Mt/yr
59. Cementos Pacasmayo, Pacasmayo, 2.9Mt/yr
60. Cemento Sur (Gloria), Juliaca, 0.2Mt/yr
61. Cementos Pacasmayo, Piura, 1.6Mt/yr
62. Cementos Selva (Pacasmayo), Rioja, 0.4Mt/yr
63. COMACSA, Lima, White Cement

URUGUAY

64. ANCAP, Minas, 0.3Mt/yr
65. ANCAP, Paysandu, 0.3Mt/yr
66. Cementos Artigas (Molins), Minas, 0.5Mt/yr (Clinker)

VENEZUELA

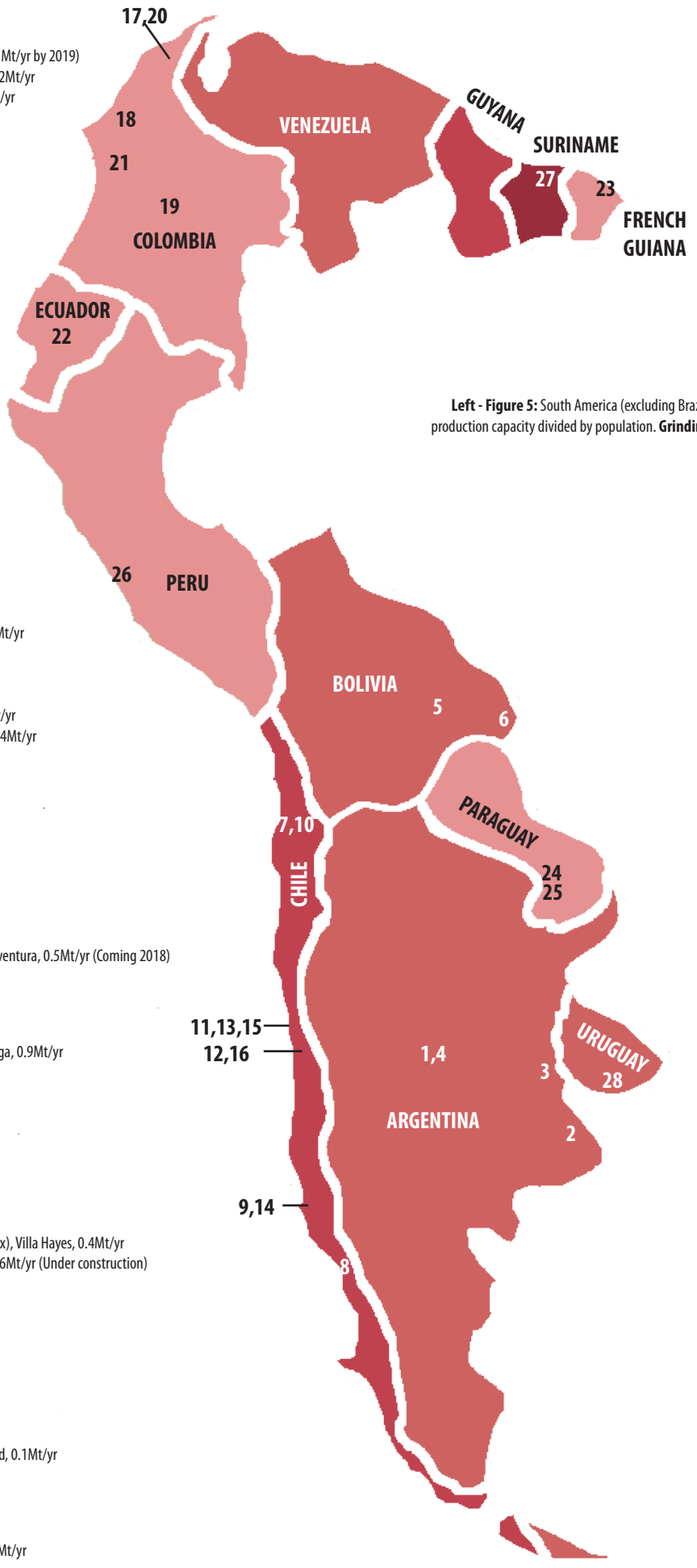
67. FNC Venezuela, Monay, 2.0Mt/yr
68 FNC Venezuela, Lara, 0.5Mt/yr
69. FNC Venezuela, Maracaibo, 0.7Mt/yr
70. FNC Venezuela, Pertigalete, 3.0Mt/yr
71. FNC Venezuela, San Cristobal, 2.2Mt/yr
72. FNC Venezuela, Ocumare del Tuy,1.3Mt/yr
73. Cementos Catatumbo, Villa del Rosario, 0.8Mt/yr
74. Invecem, San Sebastian, 1.9Mt/yr
75. Invecem, Cumarebo, 0.9Mt/yr
76. Corporacion Socialista del Cemento, Cerro Azul, 1.0Mt/yr
77. Ehdas Sanat Company, Caracas, 1.0Mt/yr
78. Corporación Socialista del Cemento, Barquisimeto, 1.2Mt/yr (Under construction)
79. Project, Peña, 0.2Mt/yr (Under construction)
80. Invecem, Monay, 0.8Mt/yr (Under construction)

ARGENTINA

1. Cementos Avellaneda, San Luis, 0.3Mt/yr (1Mt/yr by 2019)
2. Juan Minetti (LafargeHolcim), Campana, 1.2Mt/yr
3. Loma Negra (InterCement), Ramallo, 0.6Mt/yr
4. Holcim Argentina (LafargeHolcim), Yocsina Plant, 0.5Mt/yr

BOLIVIA

5. SOBOCE, Warnes, 0.2Mt/yr
6. Itacamba (Votorantim), Quijarro



Left - Figure 5: South America (excluding Brazil), colour-coded by cement production capacity divided by population. **Grinding cement plants shown.**

801-1000kg/capita
601-800kg/capita
401-600kg/capita
201-400kg/capita
0-200kg/capita

CHILE

7. Cemento Melón, Ventanas, 0.3Mt/yr
8. Cemento Melón, Puerto Montt, 0.3Mt/yr
9. Cemento Polpaico,Concepción, 0.8Mt/yr
10. Cemento Polpaico, Mejillones, 0.3Mt/yr
11. Cementos Bío Bío, San Antonio Plant, 0.3Mt/yr
12. Cementos BSA, El Bosque, 0.3Mt/yr
13. Cementos BSA, Mejillones, 0.6Mt/yr
14. Cementos BSA, Concepción, 0.6Mt/yr
15. Cementos La Union Chile, San Juan, 0.2Mt/yr
16. Hormigones Transex, Puente Alto Plant, 0.4Mt/yr

COLOMBIA

17. Cementos Argos, Sabanagrande, 0.2Mt/yr
18. Cemex Latam, Clemencia, 0.5Mt/yr
19. Cemex Latam, Santa Rosa, 0.9Mt/yr
20. Ultracem, Barranquilla, 1.0Mt/yr
21. Holcim Colombia (LafargeHolcim), Buenaventura, 0.5Mt/yr (Coming 2018)

ECUADOR

22. Holcim Ecuador (LafargeHolcim), Latacunga, 0.9Mt/yr

FRENCH GUIANA

23. Ciments Guyanais, Cayenne, 0.1Mt/yr

PARAGUAY

24. Yguazú Cementos (InterCement/Concremix), Villa Hayes, 0.4Mt/yr
25. Industria Nacional del Cemento, Villeta, 0.6Mt/yr (Under construction)

PERU

26. Cemex, Ventanilla, Plan

SURINAME

27. Vensur (Cementos Argos/Kersten), Dijkveld, 0.1Mt/yr

URUGUAY

28. Cementos Artigas (Cementos Molins), 0.5Mt/yr

Ecuador

The Ecuadorian cement sector has five integrated plants and one grinding plant that share a total capacity of 4.9Mt/yr. The largest producer is LafargeHolcim's Holcim Ecuador, which has a total capacity of 2.3Mt/yr (47%). The other owners are all based in South America. The second-largest player is Peru's UNACEM, which operates a 1.4Mt/yr integrated plant, followed by Union Cementara Nacional, which has a capacity of 0.8Mt/yr across two integrated sites. It announced that it will add a third, 0.6Mt/yr integrated plant in 2015, although no further information has since been made available. Other players in the market include Hormicreto, which operates a 0.3Mt/yr integrated plant in Cuenca.

French Guiana

French Guiana has a single 0.1Mt/yr cement grinding plant in Cayenne operated by Cementos Argos' Ciments Guyanais. It previously operated as a joint venture between Lafarge and Holcim and was sold to Cementos Argos two days after the announcement of the Lafarge-Holcim merger in 2014.

Guyana

Guyana has a 0.5Mt/yr integrated cement plant, which was opened by Caricom Cement in late 2014. As the country's cement demand is only around 0.25Mt/yr, the plant exports some of what it produces.

Paraguay

The cement industry of Paraguay is also fairly small. It has 2.0Mt/yr of capacity from one integrated plant (1.0Mt/yr) and two grinding plants (1.0Mt/yr). The integrated plant and one of the larger of the two grinding plants are operated by Industria Nacional del Cemento (INC). INC's sales were boosted by the commissioning of its Villeta grinding plant in 2017. It sold 9.85 million bags of cement in the first nine months of the year, and aimed to sell 13.5 million bags during 2017 as a whole. It is also changing the kiln at its Puerto Vallemi plant to allow it to burn alternative fuels.

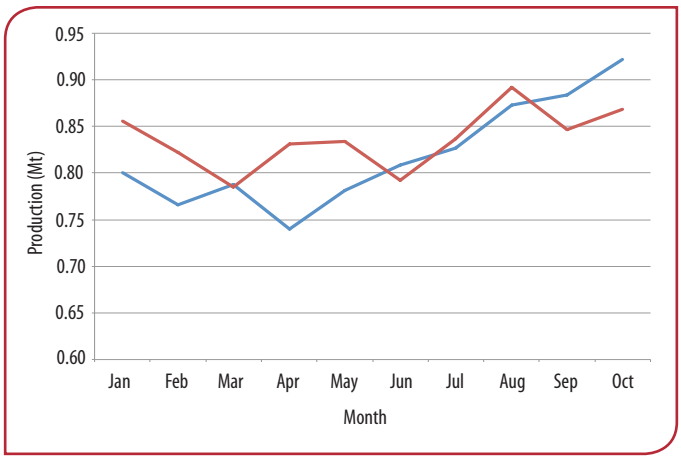
The other grinding plant (0.4Mt/yr) is run by Yguazú Cementos, a joint venture between Brazil's InterCement and Concremix.

Peru

Peru has seven integrated grey cement plants (11.4Mt/yr). There is also a white cement plant. Cement production was dampened in the first half of 2017 compared to the first half of 2016 due to the effects of El Niño on the Peruvian construction sector. Over the first six months, production was 4.68Mt, 4.8% less than the 4.92Mt that was made in the first half of 2016 (See Figure 4). A partial recovery was staged in the second half of the year. By the end of October 2017 (the last month for which national association Asocem has released data) production for the year was 8.19Mt, just 2% down on the comparable period of 2016.

Producer breakdown

The largest cement producer in Peru is UNACEM, which has two integrated cement plants with 5.6Mt/yr of capacity. The firm's profit for the first half of 2017 stood at US$120.2m, up from US$110.4m in the first half of 2016. Net sales totalled US$143.2m in the second quarter of 2017, almost the same level as recorded in 2016. The company's cement sales fell by 4.5% year-on-year in the second quarter of 2017. The second-largest cement producer in Peru is Cementos Pacasmayo, which operates two dry process cement kilns (4.5Mt/yr) and a plant with four vertical shaft kilns (0.4Mt/yr). Third is Grupo Gloria, which operates the Cemento Sur (0.2Mt/yr) and Cemento Yura (0.7Mt/yr) plants.



Right - Figure 4: Monthly cement production for Peru, 2016-2017. **Source:** Asocem.

Recent news

November 2017: Cementos Invercem announced plans to build a cement grinding plant in Ica for US$20m in November 2017. The modular plant will have a production capacity of 0.25Mt/yr and will come online in April 2018.

October 2017: Unacem filed a lawsuit alleging environmental violations against Cempor. Cempor, a joint venture between Chile's Cementos Bío Bío and Brazil's Votorantim, plans to build a cement plant in Lima. The legal move is the

latest action in a long-running battle between the cement producers over the project. Cempor has responded by alleging to National Institute for the Defence of Free Competition and the Protection of Intellectual Property (INDECOPI) that Unacem's conduct is contrary to the functioning of a free market.

Cementos Bío Bío and Votorantim originally formed Cempor in 2010 with each company holding a 29.5% stake. The other owners include IPSA and the World Cement Group with a 20.5% stake each. At that time Cempor had planned to build a 0.7Mt/yr cement plant near Lima.

Above: View over Punta del Este, Uruguay.

Suriname

Suriname has a single 0.1Mt/yr grinding plant run by Vensur, a joint venture between Colombia's Cementos Argos and Suriname's Kersten.

Uruguay

There are three integrated cement plants operating in Uruguay that share a combined capacity of 1.1Mt/yr. The largest producer is the Administración Nacional de Combustibles, Alcohol y Portland (ANCAP), which operates two 0.3Mt/yr integrated plants. The only other producer is Cementos Artigas, a Cementos Molins subsidiary. It operates a 0.5Mt/yr clinker production line at Minas, but grinds the clinker in a separate mill at Montevideo.

Another plant will shortly join the line-up. Cielo Azul Cementos y Calizas has contracted FLSmidth to build a 1200t/day (0.4Mt/yr) plant at Trienta y Tres, scheduled for completion in 2018.

Venezuela

The Venezuelan cement sector is predominantly owned by the government, due to a nationalisation policy started by former President Hugo Chavez in 2008. Prior to this, Cemex and Holcim had extensive operations in the country.

Corporatión Socialista del Cemento operates a total of 10 cement plants out of 11, either directly or via FNC Venezuela, Invecem and Ehdas Sanat. It has a total capacity of 14.5Mt/yr out of Venezuela's 15.4Mt/yr capacity. This is sufficient to give it 93% of the national supply. Today the only non-government cement operator is Cementos Catacumbo, which operates a single 0.8Mt/yr plant.

A further three government plants are at various stages of construction. When they come online, they will contribute an additional 2.2Mt/yr of cement capacity to Venezuela, giving it a total of 17.6Mt/yr.

Below: The SOBOCE plant in Viacha, Bolivia. The plant is one of the highest above sea level in the world, operating at 3907m! **Source:** German Cernadas, entrant to the *Global Cement Photography Competition.*

Pakistan: Domestic consumption rising

According to the All Pakistan Cement Manufacturers Association (APCMA) Pakistan's cement exports continued to decline in October 2017. Exports fell by 14.6% month-on-month to 443,000t, due in part to higher domestic cement consumption. However the APCMA stated that falling exports were a concern while some Pakistani cement capacity still remains idle.

The largest fall in exports was via sea, rather than overland exports to immediate neighbours. This was despite the northern part of the country, closest to India and Afghanistan, consuming 3.14Mt of cement. It is the first time that the region had consumed more than 3Mt in a single month. In October 2016 the north of Pakistan consumed 2.5Mt of cement. In the south, demand also increased from 0.52Mt in October 2016 to 0.63Mt in October 2017.

...but coal prices pile on the pressure

Rising coal prices are presenting a risk to the profit margins of cement manufacturers in Pakistan. It is expected that this sustained rise in coal prices will increase the cost of cement production in the short-term.

Major contributory factors to the higher coal prices include China's imposition to cut production to 276 days to reduce the supply glut since October 2016, while extra safety checks are resulting in tightened domestic coal supplies in the country. Moreover, tropical storms in the Atlantic basin and floods in Australia and Indonesia have given rise to logistical issues with coal supply. Nuclear outages in France are driving extra competition for coal.

To add to the already worsened supply situation, South Africa`s National Union of Mine workers (NUM), which represents 70% of employees in the coal mining sector, started a strike in November 2017 over unresolved wage disputes.

Philippines: Eagle starts work at Cebu

Eagle Cement has started construction of a US$246m cement plant in Malabuyoc, Cebu, as part of a wider expansion drive. The 2Mt/yr plant will have dedicated terminals for domestic transit of cement and export. It will take Eagle Cement's capacity to 9.1Mt/yr once it and an expansion at the company's Bulacan plant are completed. Cebu will come online in 2020, with the Bulacan expansion completed in 2018.

"We are expanding more to new markets such as Southern Luzon, Visayas and Mindanao," said Eagle's President and CEO Paul Ang. "In 2018, our third line in Bulacan will be fully functional to serve those areas, with the most efficient and energy saving manufacturing technology."

Azerbaijan: New Director General for Holcim Azerbaijan

Frederic Guimbal was appointed director general of Holcim Azerbaijan OJSC. Guimbal took up his duties in October, replacing Rossen Papazov in this post. Prior to this role, Guimbal served as CEO of Holcim India.

Uzbekistan: New Korean-backed plant

The South Korean company Evergreen Holdings has announced plans to build a cement plant in Karakalpakstan, Uzbekistan. An agreement was signed in Seoul between the representatives of Uzkurilishmaterialary and Evergreen on 22 November 2017.

The total cost of the project exceeds US$300m. Evergreen Holdings intends to implement the investment in several stages based on the demand in Uzbekistan and neighbouring countries. The first stage will involve an investment of at least US$60m.

Uzbekistan currently has five large cement plants: Kyzylkumcement, Akhangarancement, Kuvasaycement, Bekabadcement and Djizzakh Cement plant, as well as a number of small enterprises. Their total capacity exceeds 8.5Mt/yr but Uzbekistan wants to increase production to over 17Mt/yr in the period to 2022. In November 2017 Akhangarancement announced a 3M/yr plant in Uzbekistan, due for completion by 2020.

Australia: Adelaide Brighton to use wind power

Adelaide Brighton will power some of its facilities with electricity from a 278.5MW wind farm owned by Infigen Energy, according to the Australian Financial Review. Adelaide Brighton will use the electricity to supply two of its cement plants near Adelaide, South Australia, and a quarry on Yorke Peninsula.

The two companies have signed a contract that calls for the cement manufacturer to buy power from the Lake Bonney wind farm for a five-year term. Specific terms of the deal have not been provided, while the contracted amount is said to be more than the 88GWh that were contracted in a bulk power purchase agreement (PPA) deal for a wind project in Melbourne in November 2017.

India: UltraTech Cement to build US$287m plant in Rajasthan

UltraTech Cement plans to build a US$287m plant at Pali in Rajasthan. The 3.5Mt/yr unit is expected to commence operation by June 2020. The cement producer said that the plant is being set up in one of the fastest-growing markets in the country and highest cement consuming states in the North Zone of the country. It added that the plant will serve markets in western Rajasthan where the company does not have a 'significant' presence.

Indonesia: Semen Indonesia grows cement sales volumes as profits suffer

Semen Indonesia's cement sales volumes rose by 8.1% year-on-year to 25.8Mt in the first 10 months of 2017. However, despite this the company's profit declined due to falling prices, according to the Antara news agency. In addition production costs have risen due to higher electricity and coal prices.

Nepal: Huaxin makes plant preparations

Huaxin Cement is in discussions with the Investment Board Nepal (IBN) to build a cement plant. The Chinese cement producer is considering investing US$140m towards a project investment agreement (PIA), according to the Kathmandu Post newspaper. Obtaining a PIA will allow the company to work with the Nepalese government on the project.

The announcement follows a US$359m PIA with Hongshi-Shivam Cement that was signed in September 2017 for a cement plant at Sardi in Nawalparasi. The 6000t/day plant is scheduled to start commercial production in May 2018.

India: Dalmia Bharat to bid for Binani Cement

Dalmia Bharat Cement has made an agreement with the Piramal Bain Resurgence Fund to jointly bid for Binani Cement. The deal will see the two companies make an offer for Binani's two plant in Rajasthan. Binani Cement has debts of US$530m and the potential buyers are aiming to pay around US$930m. Binani Cement became insolvent following a US$110m royalty payment to state government for its limestone quarries. Other Indian cement producers, including Ultratech Cement, Shree Cement, Nirma, JSW cement and My Home Industries, have expressed interest in the cement producer.

Nepal: Nepalese standards body removes certification from two cement brands

The Nepal Bureau of Standards and Metrology (NBSM) has removed Nepal Standard (NS) certification of two cement brands marketed by Ambe Cement. Hi-Tech OPC Cement and Ambe Premium OPC Cement have had their certification cancelled, according to the Himalayan Times newspaper. The NBSM has also restricted the company from selling these brands locally. The government body says it found slag in the products despite requiring producers to only include clinker and gypsum in OPC products.

China: Water use limits in Shanxi

Shanxi province has introduced water metering rules for industrial users, including cement producers. Under the new regulations, reported upon by the local Development and Reform Commission, companies that exceed mandatory water usage standards will have to pay incremental charges. The levies range from doubling the cost of water if usage exceeds agreed levels by less than 20%, to five times the cost and the threat of cutting off of water supplies if usage standards are exceeded by more than 60%. The province also has a target to cut its dust pollution by 40% over the winter.

Above: Every drop matters in Shanxi.

Malaysia: CMS profit on the rise

Cahya Mata Sarawak's (CMS) pre-tax profit rose to US$23.4m for the third quarter of 2017 from US$23.1m in the same quarter of 2016. The group said the better profit before tax was attributable to the cement division's lower production costs. Its revenue, however, declined to US$85.0m from US$87.0m a year earlier. CMS said that the cement division's clinker and cement operations' combined profit before tax for the third quarter was 2% ahead of the corresponding quarter of 2016.

The company said that the operating environment was expected to remain challenging but that the group's strong finances would help weather the challenges. "We remain focused on growing our portfolio of businesses by taking advantage of the business opportunities in Sarawak," said a company statement. "Our strong fundamentals and resilience will enable us to perform and to deliver a satisfactory financial performance for 2017. Coupled with other measures that the management is taking, we are positioning for long-term sustainable revenue and profitability growth."

Philippines: Cigarettes go up in smoke for Holcim Philippines

Around 4.75 million packs of cigarettes worth US$2.8m and owned by Mighty Corporation, which is being wound up amid tax evasion charges, were destroyed in December at the Geocycle Compound of Holcim Philippines in Bunawan, Davao City. They were used as an alternative fuel in the plant's kiln to produce cement.

The cigarettes with counterfeit stamps were discovered at a warehouse owned by Sunshine Cornmill Co., Distribution in General Santos City, in a joint operation conducted by members of the Bureau of Internal Revenue (BIR) and the Bureau of Customs (BOC) on 6 March 2017.

"The incineration we will witness today is intended to deliver this message," said Kelvin Lee, Assistant Secretary of the Office of the Executive Secretary. "Tax evasion does not pay. We will confiscate the offending products and destroy them. No one will profit from the commission of a crime."

Global Cement would argue that Holcim Philippines is a beneficiary in this process, presumably having gained free alternative fuel!

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Syria/France: Spate of arrests in Lafarge Syria / Islamic State investigation

There was a series of high-profile arrests in the ongoing Lafarge Syria investigation in France in late 2017. First, three managers of LafargeHolcim were arrested in Paris on 29 November 2017 over allegations that Lafarge Syria, now part of the group, paid money to the Islamic State group in Syria in 2013 and 2014. They included Bruno Pescheux and Frédéric Jolibois. Pescheux was in charge of Lafarge Syria's plant from 2008 until 2014. Jolibois took over in 2014 for a short while before the plant was abandoned. A third detainee was not named. Investigators are seeking to determine whether executives at Lafarge in Paris knew that payments were being made in Syria to insurgent groups.

Then, on 7 December 2017, Eric Olsen, the former chief executive officer (CEO) of LafargeHolcim, was placed under formal investigation as part of the inquiry. He was also placed under judicial supervision. Olsen had previously been questioned along with Bruno Lafont, the former CEO of Lafarge, and Christian Herraul, the former deputy managing director for operations.

Olsen was the head of human relations during the period the probe is covering. LafargeHolcim's predecessor company Lafarge Syria allegedly paid terrorist groups in Syria to allow a cement plant to continue operating during the Syrian civil war. Olsen later became the CEO of LafargeHolcim when Lafarge merged with Holcim in 2015. However, he resigned in April 2017 following an internal review of the situation. At this time he said that his decision was motivated by his desire to draw a line under the affair. He added that he was 'absolutely' not involved in the case and had been unaware of any wrongdoing.

LafargeHolcim has not commented on the arrests but has previously admitted 'errors' in its handling of events in Syria. It denies criminal wrongdoing and said that it had 'put everything in place to ensure that this situation cannot be reproduced.'

A preliminary inquiry opened in France earlier in 2017 amid claims that Lafarge Syria had paid insurgent groups to keep roads clear around its plant in Jalabiya after the outbreak of war in Syria. In 2013, Islamic State representatives reportedly summoned two company managers in Syria to demand a cut of operations. They reportedly threatened to stop supplies to the plant and deliveries from it if they did not receive the money. The business is alleged to have paid Islamic State about Euro20,000/month, which represented 10% of the Euro5m that had reportedly been paid to a variety of armed groups.

Algeria: Exports begin

Trade Minister Mohamed Benmeradi has said that Algeria is about to become an exporter of cement. An export of Ordinary Portland Cement will be made to Gambia via the port of Arzew, according to the El Moudjahid newspaper. In a separate statement LafargeHolcim Algeria said that it would export 16,000t of cement to West Africa from its plant at Oggaz.

Liberia: Government reviews Dangote agreement

The government is reviewing an Investment Incentive Agreement between the Government of Liberia and Dangote Cement Liberia worth over US$41m. The review by the House of Representatives follows a letter from President Ellen Johnson Sirleaf urging the legislature to ratify the agreement, according to the Daily Observer newspaper. The agreement covers a 15 year period whereby the Nigerian company will build and operate a 1000t/day cement grinding plant at Monrovia. The deal also includes the option to double the production capacity of the unit.

Nigeria: Van der Weijde steps down as Dangote CEO

Onne Van der Weijde, the former chief executive officer (CEO) of Dangote Cement, has stepped down. He will leave the post at the end of 2017 to return to his home country of the Netherlands. He has served for three years in the role. Following the departure he will be appointed as a non-executive director with effect from 1 January 2018.

Until a permanent successor is appointed, JO Makoju, Honorary Adviser to the chairman and former managing director of Lafarge WAPCO will be the acting managing director and CEO of Dangote Cement.

Senegal: Government to restrict cement permits

Aissatou Sophie Gladima, the Minister of Mines and Geology, says that the Senegalese government will only issue new operating permits to cement producers if there is evidence that existing plants are unable to meet local demand. Gladima made the comments on a visit to the Dangote Cement plant at Pout in Thies.

South Africa: PPC loses three bidders in a week...

PPC lost the three formal bids that had been made for its assets in the space of a week in December 2017. First, in the week ending 8 December 2017, PPC said that Ireland's CRH had formally decided not to continue in a bid for it. The Irish building materials company made a non-binding expression of interest in mid-November 2017. It then had time to conduct due diligence before submitting an updated bid.

Then, on 11 December 2017, Canada's Fairfax Holdings stopped its bid for PPC. The investment body made an offer of around US$150m in September 2017 to buy a partial stake in PPC on condition that the cement producer agreed to a merger with AfriSam. The South African cement producer subsequently described the offer as 'low' to its shareholders and said that it was anticipating a higher offer. Nigeria's Dangote Cement, which had also submitted an bid, withdrew its offer in October 2017. The remaining bid, from LafargeHolcim, was removed on 13 December 2017.

...as it trails details of a 'mega-plant' in the Western Cape

PPC is planning a 'mega-plant' in the Western Cape Province. Johan Claassen, PPC's interim chief executive, stated that it was looking to replace its Reibeeck plant with a 'semi-brownfield' facility that used around 25% of the current plant's equipment. The company has long planned to expand its Western Cape capacity but domestic demand has not yet been high enough to justify the investment. There has been overcapacity in the market as well as imports from other regions, both of which have depressed cement prices.

Claassen said that the plant would cost around US$200/t of installed capacity, without mentioning the intended capacity. He said that financing was already in place. He added that PPC had been able to increase its selling prices by 2% in the six months to 30 September 2017 and that, even with slow growth, South Africa would need the additional capacity supplied by the new plant by 2020. Claassen said that a formal announcement regarding the plant would be likely in early 2018.

Mozambique: Ambrian forecasts 25% sales growth in 2017

Ambrian, the UK-based owner of the Cimentos da Beria grinding plant, forecasts that its sales will rise by 25% year-on-year in 2017 from 2016. The prediction follows a poor third quarter where sales volumes fell by 16% and the company described the economic conditions in the country over the past year as 'challenging.' The group added that it has seen cement prices improve year-on-year and that the plant in Beira is now generating positive earnings before interest, taxation, depreciation and amortisation (EBITDA).

However, Ambrian also reported that it is facing 'urgent' short-term liquidity issues owing to difficulties in moving cash resources held within the group to the company. It is currently trying to secure short term financing and a longer-term strategic partnership and investment for the group as a whole to allow it to reduce its debt and develop its business in Mozambique.

Nigeria: Mining ministry and BUA Group argue over mining dispute

The head of the Ministry of Mines and Steel Development has publicly rebutted accusations by Abdulsamad Rabiu, the chief executive officer (CEO) of BUA Group, that the ministry and Dangote Cement have 'sabotaged' operations at the company. Rabiu made the allegations in a letter sent to President Muhammadu Buhari, according to the This Day newspaper.

Rabiu says that the rival cement company and the ministry colluded in a legal dispute about operations at Okpella in Edo State and mineral resources. Allegedly, a militia attempted to damage the cement plant before security forces intervened. Later government officials and police tried to stop work at a BUA Cement mine despite on-going legal action.

Mohammed Abass, the head of the Ministry of Mines and Steel Development, responded by describing Rabiu's accusations as, 'an unwarranted campaign of calumny against the ministry.' He added that the cement company was attempting to blackmail the ministry into granting a 'free pass' for illegal operations. The ministry says that it issued a Stop Work Order for the disputed mine in 2015 but that BUA Group ignored it and has continued to work at the site while the legal case was pending. Later, the staff of BUA Group resisted an attempt to shut the site down in mid-November 2017.

CALL FOR EXPRESSION OF INTEREST FOR THE ACQUISITION OF A MAJORITY STAKE (50.52%) IN CARTHAGE CEMENT S.A

Object of the Call for Expression of Interest

The Tunisian State and Bina Corp (the "**Sellers**"), the controlling shareholders of Carthage Cement S.A (the « **Company** » or « **Carthage Cement** »), have decided to proceed, through a public tender, to the sale of majority stake (50.52%) in the Company to a strategic and/or a financial investor who is capable to insure its management and development.

For this purpose, the consortium formed by ECC MAZARS, IEG TUNISIA – Corporate Advisory and Mrabet Avocats (the "**Advisor**"), is acting as the Exclusive Advisor of Al Karama for achieving the entire sale transaction (the "**Transaction**").

The purpose of this Call for Expression of Interest (the "**Call**") is (i) to inform investors about this Transaction, (ii) to describe the sale process, and (iii) to guide the interested investors on the pre-qualification document's withdrawal.

Company Overview

Carthage Cement S.A is a public company which is specialized in the production of cement, aggregates and concrete. The 2.2 million ton capacity plant which was equipped by a market-leading supplier of cement industry equipment, is located in the southeast of Tunis (~ 35 kilometres) at the bottom of Djebel Rsas, a Jurassic limestone outcrop. The company operates two side-by-side quarries, the first has an area of 218 hectares and is on property, whereas the second measures 140 hectares and is leased from the public property. A more detailed presentation of the company is available in the prequalification documentation.

Sale Process

The sale process will be conducted in two phases: A pre-qualification phase and a binding offer phase open to all pre-qualified investors.

Withdrawal of Pre-Qualification Document

Investors interested in participating into the sale process are requested to withdraw the pre-qualification document that defines the Transaction process and the pre-qualification criteria, from Tuesday, 19/12/2017 - 10 am CET at Al Karama Holding's headquarters located in Rue du Lac d'Annecy, Passage du Lac Malawi - Les Berges du Lac - Tunis.

The withdrawal of the pre-qualification document is conditioned by (i) the presentation to the Seller of the non-disclosure agreement (the "**NDA**") duly signed by the legal representative of the interested investor, and (ii) the payment a non-refundable fee amounting to four thousand and five hundred Tunisian dinars (4,500 TND). Fees are payable by cash, by certified cheque in favour of Al Karama Holding or by bank transfer.

Pre-Qualification Phase

This Call for Expression of Interest is open to Tunisian or foreign legal entities. Interested Investors may act alone or form a consortium represented by a leader.

At any time during the process, Al Karama Holding reserve the right to exclude any candidate from participating in the sale process in case of non-compliance with the regulations.

Interested investors should submit their Expression of Interest directly or send it by Rapid Post (date as per postmark) to the following address:

Al Karama Holding, Rue du Lac d'Annecy, Passage du Lac Malawi, Les Berges du Lac, 1053 Tunis.

The deadline for submitting the Expression of Interest is set to :

Friday 16/02/2017 at 5 pm CET

Financial Offer and Due Diligence

The pre-qualified candidates will be informed of their qualification on Friday 02/03/2018 and will be invited to withdraw the tender documents including (i) the tender terms and conditions, (ii) the Information Memorandum and (iii) drafts of the share purchase agreements (SPA).

They will have the opportunity to conduct Due Diligence, to visit the plant, to meet the management and to propose amendments to the SPA.

For any further information about the Transaction, interested investors are invited to contact:

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GLOBAL CEMENT NEWS: *MIDDLE EAST & AFRICA*

Congo: Dangote inaugurates Mfila

Dangote Cement commissioned its new Mfila plant in the Republic of Congo on 23 November 2017. The 1.5Mt/yr integrated facility, which cost US$300m to construct, will employ around 1000 direct workers and contribute to the creation of many indirect jobs. It is the largest cement plant in the country.

At the inauguration ceremony, Congo's President Denis Sassou Nguesso said that the construction of the plant marked part of an 'industrial revolution' in the Economic Community of Central African States (CEMAC). He said that Congo was happy to host Dangote Cement, which he had observed operating to the benefit of other sub-Saharan African countries. He said that the timing of Dangote's investment was fortunate as the country needed to diversify its economy in light of falling oil revenues.

The Nigerian President Mohammadu Buhari was represented at the event by a delegation led by the Minister of Mines and Steel Development, Dr Kayode Fayemi. He commended Aliko Dangote for contributing to the economic development of Africa and said that his 'sterling accomplishment' made Dangote Cement a 'worthy ambassador' of Nigeria.

Tanzania: Talks over US$1bn plant

Industry, Trade and Investment minister Charles Mwijage says that senior officials from the Treasury and Tanzania Investment Centre (TIC) are finalising talks with China's Sinoma and Hengya Cement about building a US$1bn cement plant in the Tanga Region. The discussions are focusing on incentives to be offered to the investors and the location of a jetty. The plant will have an initial production capacity of 2.5Mt/yr, with an eventual target of 7Mt/yr after further investment.

Above: Left to Right: Dr Kayode Fayemi, Nigerian Minister of Mines and Steel Development, Aliko Dangote (President & CEO of Dangote Group) and Denis Sassou Nguesso (President of the Republic of the Congo) at the commissioning of 1.5Mt/yr Dangote cement plant in Mfila on 23 November 2017.

Here ***Global Cement Magazine*** presents its monthly review of global cement prices, in US$ for easy comparison. Much more price information (including the latest information on prices and market trends throughout the global cement industry from our price correspondents) is only available to subscribers of ***Global Cement Magazine***.

To get additional prices, you should subscribe - **See page 64**. In this issue subscribers receive information from 11 more countries, including Pakistan, Zambia, Zimbabwe, Nigeria, South Africa and Uganda.

Egypt: Ordinary Portland Cement prices as of 15 December 2017: Arabian Cement (Al Mosalah) = US$51.48/t; Arabian Cement (Al Nasr) = US$48.70/t; Cemex (Al Muhandis) = US$53.74/t; Building Materials Industries (Altaamir) = US$49.80/t; Elnahda Cement (Al Sakhrah) = US$48.87/t; Wadi El Nile Cement = US$49.54/t; Medcom Aswan Cement = US$49.26/t; Lafarge (Al Makhsous) = US$49.99/t; Arish Cement = US$49.82/t; Sinai Cement = US$49.54/t; Suez Cement = US$51.22/t; Tourah Portland Cement = US$51.22/t; Helwan Cement = US$51.22/t; Misr Beni Suef Cement = US$49.54/t; El Sewedy Cement = US$51.39/t; South Valley Cement = US$48.98/t; Misr Cement Qena = US$49.54/t.

White cement prices as of 15 December 2017: Sinai White Cement (Alabid Elada) = US$99.64/t; Sinai White Cement (Super Sinai) = US$96.85/t; El Menya Cement - Super Royal = US$96.29/t; Menya Helwan Cement = US$96.29/t.

Blended cement prices as of 15 December 2017: Helwan Cement - Alwaha = US$46.46/t. Sulphate-resistant cement prices as of 15 December 2017: Cemex Albukawem = US$53.74/t; Suez Cement (Al Suez Sea Water) = US$53.18/t; El Sewedy Cement = US$53.46/t.

A new health insurance law, somewhat bizarrely, will add US$1.12/t to the price of cement when it comes into force. This appears to be one of a number of sources of revenue for the provision of a public health insurance system.

Kenya: A 50% reduction in electricity prices for the eight hours between 22:00 and 06:00 is expected to feed through to lower cement prices. The move is due to a new directive from President Uhuru Kenyatta, which took effect on 1 December 2017. The move was immediately welcomed by Savannah Cement and National Cement.

China: Sunsirs Commodity Data Group reports All-Chinese cement prices: 9-10 December 2017 = US$62.13/t; 11 December 2017 = US$63.13/t; 12-13 December 2017 = US$63.38/t; 9 December 2017 = US$63.75/t.

Impacted by air pollution regulatory policies and a worsening shortage of raw materials, the members of the Wuhan Concrete Association staged a strike in mid-December 2017 over 'soaring' cement prices, from US$22.73/t to US$30.30/t. If they were anywhere else, the concrete producers would be very happy indeed!

India: All-India cement prices increased by US$0.06/bag (50kg) month-on-month in December 2017 to US$5.04/bag. The increase was more pronounced in the north of the country, where prices rose by US$0.25/bag as companies attempted to offset cost increases after petcoke use was banned in three states. This ban has since been relaxed for cement producers.

Prices in the south and east were flat, while the west saw a marginal decline. Overall, prices are still down by US$0.41/bag from the peak of US$5.45/bag seen in May 2017.

The price increase was the highest in Delhi (US$0.39/bag month-on-month) followed by Haryana (US$0.31/bag increase) while Punjab and Rajasthan saw an increase of (US$0.20/bag increase) due to the switch to a higher cost fuel.

Malaysia: Data from CEIC states that the price of cement is US$4.51/bag (US$89.94/t). In April 2018 the price was around US$4.78/bag.

Prices are for cement in metric tonnes, unless stated otherwise. Where a source has given a range, the published price is the minimum value.

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CIF {+ the named port of destination} = Cost, Insurance and Freight: The cargo insurance and delivery of goods to the named port of destination (discharge) at the seller's expense. Buyer is responsible for the import customs clearance and other costs and risks.

ASWP = Any safe world port.

Conversions to US$ from local currencies are as at the time of original publication.

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Make the most of your burgers and steaks while you can...

Robert McCaffrey Editorial Director, ***Global Cement Magazine (rob@propubs.com)***

I like a nice steak as much as anyone. Especially with chips (French fries or 'Freedom fries' to the Americans, depending on the current French/American diplomatic state) and a nice salad. However, maybe I won't be able to enjoy it for too much longer - and the reasons why have important implications for cement.

A new report[1] from the Farm Animal Investment Risk and Return (FAIRR) Initiative suggests that governments around the world are increasingly considering the imposition of 'meat taxes,' for two main reasons: public health concerns and for environmental reasons. Of course, governments will always consider new taxes for a third and possibly most important reason: in order to raise revenues for their own use. They never put it like that of course (apart from the rare case of hypothecated or 'ring-fenced' taxes for popular measures like public healthcare).

FAIRR suggests that governments should consider taxing meat for the following reasons:

- Greenhouse gas emissions from meat-based agriculture that amount to around 15% of the total;
- An increasing incidence rate of global obesity and associated higher risks of type 2 diabetes and cancer linked with meat-eating;
- Increasing levels of antibiotic resistance in farm animals and in humans;
- Threats to [overall] global food security and [regional] water availability; and
- Soil degradation and deforestation.

At this point, it's reasonable to ask about the motivation for FAIRR to bring this to our attention. It seems to be a campaigning organisation that seeks to improve animal welfare through making the investment community more aware of actual and potential problems with intensive animal husbandry: 'The FAIRR initiative aims to build a collaborative network of institutional investors to help bridge this knowledge gap and to help mitigate risks and identify opportunities across the protein production chain.'

Not least of its worries is that of increasing antibiotic resistance (which could cost the world US$100tn in lost output to 2050). As you may know, antibiotics are used widely in intensive meat farming, not only to ward-off infections, but also to improve muscle development. In animals, as in humans, when antibiotics are used and some nominally-susceptible microbes survive, the survivors will be increasingly immune to the effects of the antibiotic (through population selection and through random mutations). Where that antibiotic was once useful, it eventually becomes ineffective - not just in individual animals (or humans) but in larger and larger populations of animals (or humans). Bugs that have evolved antibiotic resistance start to thrive and can be passed from being to being. That can include from animals to humans[2]. Fairly simple measures can be taken to avoid the transfer (cooking meat properly, washing your hands, and so on). However, if there was a bacteria that was resistant to antibiotics and it was going to do you some serious harm, you would want to wear one of those Ebola-suits, wouldn't you? I would. That's one reason why I like my steaks pretty well-done.

Anyway, coming back to FAIRR's list of reasons to avoid investing in meat production, we should look at their claim as to the 'Global Warming' effects of meat production. Meat-based agriculture creates as much as 15% of the world's greenhouse gases, mostly in the form of methane, from cows belching and producing wind, but also through clearance of forests. Meat is easily the most CO_2-intensive form of food[3], producing at least 40kg of CO_2 per 1kg of lamb, 27kg for beef and 12kg for pork. Alas for enthusiastic meat-eaters, the foods with the lowest CO_2-intensity are broccoli, tofu and lentils (all at less than 2kg of CO_2 per 1kg of food).

FAIRR suggests that meat will eventually join tobacco, alcohol and sugar on the list of products subject to 'sin taxes.' In fact, the 1993 Sylvester Stallone movie 'Demolition Man,' set in 2032, foretells the same point, in that meat is banned (as are other pleasant but 'sinful' pastimes).

What's this got to do with cement? Well, activists working their way down the list of industries that have the largest CO_2 emissions[4], starting with electricity generation and transportation, nodding towards the intransigent sector of commercial and residential buildings, other industries such as chemicals and steel and having ticked off agriculture, then the cement industry will eventually hove into view as a juicy target.

If meat - something that many of us enjoy in its many delicious forms - can be 'taxed,' then what hope do we have of defending the unlovely grey dust that is cement?

1 http://www.fairr.org/resource/livestock-levy-regulators-considering-meat-taxes/

2 https://www.cdc.gov/narms/faq.html

3 http://static.ewg.org/reports/2011/meateaters/pdf/methodology_ewg_meat_eaters_guide_to_health_and_climate_2011.pdf

4 https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions

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