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This issue's front cover...

Wikov: 1918 was a magical year for Wikov, a brand known for mechanical gearboxes for the cement industry and many other gear products. 1918 was the year when the Škoda works in Pilsen started producing gears and gearboxes. In December of the same year, Wichterle-Kovarik, then as two independent mechanical engineering companies with similar scope of production, merged to create a strong Wikov brand. A few years later, Wikov started production of technically sophisticated cars for wealthy clients. The Wikov 7-28 Sport shown on the cover was the very first model of the low-series production made by Wikov.

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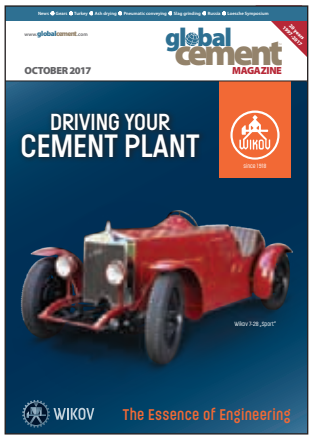

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Dear readers,

When I was about eight, I got hooked on motorsport. I cut pictures out of *Autosport* to put on my wall and made little race reports like I saw in the magazines. In 1996 things escalated when I went so far as to write a complete review of each Formula 1 race, putting everything in a little magazine at the end of the year. What's the connection to this issue of *Global Cement Magazine*? Well, after 20 years I have finally edited a magazine with a car on the front cover - A childhood dream realised!

The vehicle in question is a Wikov 7-28 Sport, built in 1925 by Wikov, today a major manufacturer of gear components for the cement sector, as well as numerous other industrial applications. *Global Cement*'s David Perilli recently visited the company at its two production sites in Czechia to learn about the group's history, see its impressive production facilities and speak to its senior management about how it is driving forward the gear production sector - Turn to Page 8 to read his full report.

Other technical features in this issue include a comparison of roller presses and vertical roller mills for slag grinding (Page 20), a look at Coomtech's novel ash drying technology, which may also have applications for a range of other types of particles (Page 16), and a look at frequency-modulated continuous wave radar technology to increase the reliability, accuracy and safety of silo level measurements in cement plants (Page 18). There are also case-studies on material handling from Denmark (Page 32) and Burkina Faso (62). Elsewhere in this issue, we have a look at the Turkish cement sector to coincide with the *14th TÇMB International Technical Seminar* in Antalya, Turkey on 10-13 October 2017 (Page 38), a report on the cement sector in Russia (Page 46) and all of the latest news in our regional news sections.

We hope you enjoy this issue of *Global Cement Magazine* - the world's most widely-read cement magazine!

Peter Edwards
Editor

Cement Industry Suppliers' Forum

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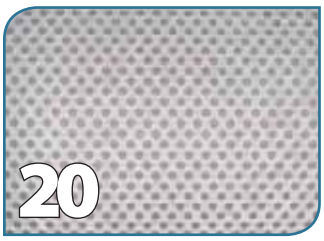

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20 YEARS OF INNOVATION

David Perilli, Global Cement Magazine

Wikov - Driving change in the gear industry

Wikov Group is a leading mechanical gear manufacturer for the wind, marine, rail and other sectors, including the cement and mineral processing industries. *Global Cement* recently visited its plants in Pilsen and Hronov in Czechia to profile the company and to find out what drives it forward...

Gear manufacturer Wikov faces a challenge. Owing to the company's composite history from different Czech gear manufacturers such as Škoda and ČKD it is well suited to both custom projects and mass production ranges. The expertise and technical knowledge of the company's design division Orbital 2 and its plants at Pilsen and Hronov offer German levels of engineering but with a cheaper workforce, well placing it to tackle bespoke projects and develop new solutions and products. However, cutting-edge innovation requires industry partners and is financially risky. On the other hand, the group also has the production capacity to support standardised ranges of components at a competitive price as it grows its original equipment manufacturer (OEM) status in the cement industry.

History

Wikov Group comprises a group of well-known Czech engineering companies brought together by geologist-turned-investor Martin Wichterle over the past 15-20 years. Each of the main strands of the group has their own distinct heritages, dating back to the 19th Century.

The group takes its name from Wichterle's family company ***Wi***chterle-***Kov***ářík, giving the group its name of Wikov. This company started out in 1878 producing agricultural machines and tools. It merged in 1918 to form Wichterle-Kovářík, before diversifying into diggers, steam engines, generators and cars. Later it was nationalised and Wichterle acquired the brand name in 2004.

Wikov Gear, based in Pilsen, joined the group in 2004. It dates back to 1859 and was originally a part of Škoda machine works. Specialised gear production at Škoda started in 1918 and Wikov Gear continues this technical knowledge and heritage.

Wikov MGI, based in Hronov, joined the group in 2002. Previously it was known as ČKD Hronov with a production history at the site that dates back to 1884. In 1898 Mach & Fišer started making agricultural equipment and bending machines. Following nationalisation after the Second World War the factory was merged into ČKD Group, with production refocused on large scale machine production for the Russian market. ČKD Hronov started production of gearboxes for ships in 1974 and gear and gearbox manufacture has gradually come to dominate its output since that time.

Other parts of the group include Orbital 2, Wikov's research, development and design wing, based in Prague and the UK. This company was set up by British flexible pin pioneer Ray J Hicks together with Frank Cunliffe in 2002 before joining the group as an independent member in 2004. The group also includes Wikov Sázavan, a precision parts and machining manufacture unit, as well as sales subsidiaries in North America, China and Russia.

Below: Outside the Wikov Gear plant in Pilsen, Czechia. This part of Wikov Group was originally part of Škoda. The older logo was kept to preserve the history and show the evolution of the Wikov brand.

Production process

Gears and gearboxes are produced at the sites in Pilsen and Hronov by Wikov Gear and Wikov MGI. Wikov Gear focuses on products for cement and mineral processing as well as for oil and gas, power generation, turbo applications, sugar production and the marine sector. Wikov MGI concentrates on rail, hydroelectric power generation, wind and tidal power, rubber and plastics and metallurgy applications, also building complete drive chains.

At Wikov Gear, the production process consists of six stages: hobbing, grinding, heat treatment, inspection, assembly and testing. The process functions as a series of workshops, with workers passing parts onto

Above left: A Klingelnberg C100 U HPG machine at Wikov Gear. This tool is used for bevel gear cutting.

Above: Gear production at Wikov Gear operates as a series of workshops, with workers passing completed parts onto the next team in the chain

the next team in the production process. As Wikov Gear's Technical Director Radovan Rašpl explains, the company's expertise lies first in designing gearboxes followed by precision production.

Hobbing is the process where the gears are initially cut out of the raw metal. Wikov uses forgings from Czechia or Western Europe. This is followed by grinding, the most important step due to the exacting precision these products require. Accuracy is critical, as mistakes can generate cracks that lead to scrappage. Both hobbing and grinding use a mixture of manual and computer numerical control (CNC) machine tools. Heat treatment takes place at Wikov MGI in Hronov, nearly 250km away. A shuttle truck travels between the sites to transfer parts back and forth every day. This support from within the group means that Wikov Gear does not have to outsource heat-treatment services, unlike some other manufacturers.

Inspection then follows back in Pilsen to ensure accuracy. This takes place in a climate-controlled environment at 20°C with a fixed humidity. Parts acclimatise to the conditions for up to several days before being inspected for accuracy of gearing geometry using 3D measuring devices. Once the parts have been cleared by inspection, they are released to assembly where the gearboxes, drives, housings and other products are put together manually by a team of specialists. Worker skill at this stage is critical as misassembly can damage parts. Another requirement is for a clean working environment, which means no drilling, grinding or other such work in the inspection area.

Each half of the Pilsen factory has its own crane with a capacity of up to 50t. This posed particular challenges for a 120t Side Drive ordered for a horizontal ball mill from Russia's OAO Spassk-Cement. On this occasion the gearbox was assembled, tested and then disassembled before shipping in what Rašpl describes as 'a big job.'[1]

Wikov Gear also has a dynamic testing lab for completed high-speed gearboxes of up to 35,000rpm. Principally this is used for high-speed applications in the power and oil and gas sectors and represents a unique capability for gearbox manufacturers in Europe. Typically a test will last four hours, with inputs such as lubricant consumption measured from a control room. In addition the group has three other testing facilities at its Hronov plant, including cold climate gearbox testing of down to -50°C.

Wikov Gear can produce gearboxes from 800kg to 120t. Actual production time depends on the product in question. For example, a Side Drive - one of Wikov's specialist gearboxes, could be produced in three months depending on design time, a clear production schedule and the availability of third party parts such as bearings. Normally a month is required for a design to be prepared. Then forging the gears themselves can take 6-12 weeks.

Left: The Wikov 7-28 was the very first series model of Wikov company. It was made in 1925 and it had an advanced four cylinder overhead camshaft engine. The cars were hand-made in low-series production.

Above: Inspection of parts at Wikov Gear takes place in a climate-controlled environment at 20°C with a fixed humidity.

Above right: Wikov Gear has a dynamic testing lab for completed high-speed gearboxes up to 35,000rpm. The group has three more testing labs at Wikov MGI, including cold climate gearbox testing of down to -50°C.

Key products for cement plants

Wikov's main products for the cement industry are its Side Drive range for horizontal ball mills and its planetary gearbox range Orbi-fleX with flexible pin for horizontal ball mills and roller presses. It also offers its parallel-shaft range for horizontal ball mills and kiln drives, its CM range for horizontal ball mills, its VMH range for vertical roller mills and other offerings including bevel-helical gearboxes for vertical mill drives and heavy duty belt conveyors and bevel gear sets for cone crushers. In addition, the company affords a wide range of customisation as well as fully bespoke options. Recently the group has also started to offer its remote monitoring service, WiGuard, to provide online gearbox monitoring and diagnostics.

Planetary Gearboxes Orbi-fleX

Wikov's 'ace-in-the-hole' since the group came into being is its Planetary Gearboxes Orbi-fleX range using flexible pin technology. The creator of the flexible pin, Ray Hicks, founded Orbital 2 with Frank Cunliffe in the UK in 2002 to develop design and license the manufacture of epicyclic flexible pins for the renewable energy industry, specifically wind power applications.

This company was subsequently purchased by Wikov in 2004 and it took development of the concept further. A flexible pin with patented overload stop was introduced to the market by Wikov in 2005. Wikov MGI in Hronov then ran the development work with Orbital 2 before expanding the concept out to the rubber, sugar and then cement and mineral processing industries.

As Zbynek Berger, the managing director of Wikov MGI explains, the technology is extremely reliable, with no failures reported in nearly 10 years across 550 references. It has been a major success for Wikov. Berger says that Wikov's experience with the Orbi-fleX design means that Wikov MGI supports Wikov Gear to implement sophisticated planetary gearboxes in cement sector products without repeating the mistakes that always arise when embarking on the 'learning curve' of making planetary gearboxes. The key features of the range are higher power density and smaller size and weight that planetary gearboxes allow and the protection against power overload that the flexible pin concept offers.

Side Drive

The Side Drive was originally developed for a client in Turkey in 2006. Radovan Rašpl was part of the development team for the Side Drive and he detailed how it was created. "The biggest problem in cement is very small particles of 2µm and they are everywhere. It goes to the oil and after some time they have an abrasive function. So all the gears become very worn after several years and also it can transfer to the nozzles that spray the oil to the lubricating points. After one to two years we saw that a lot of gearboxes failed."

To combat this, Wikov decided to completely enclose the lubrication system. Following a project development cost of Euro1m, a

Right: Staff assemble the gearboxes at Wikov Gear by hand. High skill and precision is mandatory to meet Wikov's demanding standards.

prototype was designed by Wikov Gear and built and tested in conjunction with the Research and Testing Institute Plzen. Owing to grant restrictions the original prototype was destroyed but subsequently Wikov received a large number of orders for the Side Drive, particularly in Turkey and from customers in the Middle East and Africa, where it has become a core product for the company.

The key innovation of the Side Drive is its separate lubrication system. Reducing the contamination of the lubrication system reduces wear to gears, bearings and other components, leading to extended product lifespan. The range comes in three models with a power of 2500-6000kW and a related torque of 255,000-450,000Nm with, as ever with Wikov, endless customisation options.

WiGuard

One of Wikov MGI's newer initiatives, the WiGuard system is a continuous remote monitoring service for any of the group's gearboxes. On site sensors monitor vibrations, temperature, pressures, flow capacity, torque, oil quality and oil particles. Reporting takes place via an internet connection to Wikov, allowing the company to provide diagnostics and continuous measurement, safety alarms and ultimately reduced maintenance and service costs, higher reliability and extended gearbox lifespan. As Tomas Zrostlik, the managing director of Wikov Gear in Pilsen explained, the WiGuard system has helped the company spot problems in customer installations before they cause too much damage. "A gearbox is the heart of the complete system. All the forces go through the gearbox and it has to absorb them and sometimes it isn't designed for that."

The product launched in 2014 and has offered useful data, particularly for remote sites such as those in the Far East. Product sales are growing and Wikov Gear now needs to increase the size of its WiGuard team to handle demand.

Interview with managing team at Wikov Gear and Wikov MGI

Global Cement (GC): **What share of your business comes from the cement industry?**

Tomas Zrostlik, Managing Director of Wikov Gear (TZ): The cement sector these days for Wikov Gear comprises maybe 15% of business. It's difficult because it varies. For example, at present we have successfully signed some big contracts so it's higher than it has been in the past right now.

GC: **Where are Wikov Gear's markets located for the cement industry and how are they served?**

Left: Wikov Gear's Technical Director Radovan Rašpl stands in front of a Gleason Pfauter P 2400 / 2800 hobbing machine.

TZ: These days we see a lot of requests from the Middle East and North Africa. We can't talk about OEM applications but we signed a pretty good contract with a significant player in Germany using the Side Drive application. The rest of our OEMs are in the US.

On the aftermarket side, it is a different story because we are flexible. We do lots of replacements for end users, wherever they may be in the world.

Left: Tomas Zrostlik, managing director of Wikov Gear, in the assembly area. Note the designs in the background that the staff use to assemble the gearboxes by hand.

GC: **What is the most common piece of equipment requested by cement plant customers now?**

TZ: At the moment we are getting a lot of requests for helical gearboxes from the cement sector.

GC: **How has the gear industry evolved with respect to the cement industry in recent decades?**

Left: Zbynek Berger, managing director of Wikov MGI, stands in the heat treatment area at Wikov MGI. Heat treatment for parts at both plants takes place in Hronov with a shuttle truck running daily.

TZ: Compared to the gears we supplied 20 years ago, everything today is smaller, more efficient and more precise. Whereas previously a gearbox might weigh, say 30t, the same gearbox today would weigh more like 10-15t. There is now a high demand for efficiency and the customer is asking for a three, four or five year guarantee. To enable us to keep up with these increasing requirements, we invested a lot in the past decade in new technologies such as new profile grinders, measuring devices, a new Visual Tool Setter (VTS) and analysis system, as well as in the building itself at Wikov Gear.

Also, a lot of gearbox manufacturers are standardising their products. When we started to develop planetary gearboxes for different applications, we knew how to do it and we used a standardisation system for the products. The gearbox is not the same but the components, the method and the layout are very similar. The same method is also applied in the railway industry for example, where Wikov MGI is quite strong.

GC: **Can you explain how Wikov's service and spare parts network fits into your business?**

TZ: The cement industry is complicated for us because we call it a 'low speed industry.' The accuracy of the gears themselves is not as high as in, for example, a high-speed gearbox. So there are many companies that are able to do repairs, refurbishments and upgrades locally. For example, in Egypt there are a lot of companies that can maintain gearboxes and make spare parts. However, if somebody asks for a complete mill they definitely go for a good quality because they want it to last for 15 years. In addition when a gear is broken they need to replace it right away. In that situation, they can pay somebody to do it very quickly. So definitely, the spare parts business is good. We would like to extend it but today it is, maybe, 10% of our sales. The majority of the business is new supply, the complete gearbox.

Below: Part of an Orbi-fleX planetary gearbox originally commissioned for a large scale wind turbine.

GC: **What are your plans for the WiGuard remote condition monitoring system?**

TZ: We want to develop WiGuard further and we hope to move to a full 24/7 service for our customers. This can also generate other revenue for us as we build up our data on the operation of our gearboxes. We can then implement this knowledge into future development to decrease the cost of manufacturing. It may also help us to extend product lifespan.

GC: **What are the technical key challenges that Wikov faces with respect to the cement industry?**

TZ: I would say that the answer depends on the application. The quality of the gears influences the lifetime of the bearings and the gearbox itself. For example, the Side Drive has a high risk of improper installation. For the helical gearbox it is the alignment of the couplings compared to the input shafts. For the vertical mill it is definitely the loop of the axial bearing. For the roller press it is the good timing of both roller presses. For the kiln it is the alignment of the shafts itself. There are certain issues that appear on different applications.

GC: **How has Wikov Gear coped with the economic downturn since 2008 and subdued construction markets in Europe?**

TZ: Generally I would say the first two years were very worrisome because the market stopped, everybody panicked, there was no new investment and everything was postponed. It was tough. The end users, the cement plants, still had to do some maintenance because there was still demand for cement and clinker. So we still supplied pinions, shafts and sometimes replacements of gears, but the market definitely dropped.

GC: **Are you expecting any changes in the cement industry going forward?**

TZ: I would say that the cement industry is conservative so I don't feel that there will be big changes. We might see the replacement of helical gearboxes with planetary ones, but some parts of the sector are quite resistant to new technologies. It's a big step due to existing space and technology, but it's possible.

Lukas Steiner, Marketing Manager at Wikov Gear (LS): In the broader sense of things, we also need to know how many new cement plants are being built and where. At the moment, however, the market is consolidating globally.

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Right: A Niles ZP 20 profile grinding machine. Grinding requires the most accuracy of the gear production process and it is here that Wikov's expertise shines.

***GC:* What investments have been made recently?**

TZ: At Wikov Gear lots of new machines were added after 2004, with the majority coming between 2007 and 2009 when we purchased our largest grinding machines and a shaping machine. In 2016 we bought a three-axis machine and a new profile grinding machine, which we received in January 2017. We spent around Euro15m just on machines.

Later in 2017 we will buy a five-axis machine. This machine will allow offset milling and turning on a single lathe. When you clamp the piece you can do the turning and the milling out of axis, not only in the axis but outside.

LS: At Wikov MGI over Euro55m has been spent over the last decade covering new machine tools, a new administration building and testing facilities.

MS: Investment in testing has been huge, including the cold climate chamber. This allows gearboxes to be properly load tested and tuned. The results are worth their weight in gold!

Right: Heat treatment of parts produced at Wikov Gear in Pilsen takes place 250km away at Wikov MGI's plant in Hronov. Wikov is the only gearbox manufacturer in Central Europe that operates its own heat treatment facility.

***GC:* Do you have any plans to expand or upgrade your production sites?**

TZ: Our building in Pilsen is almost 70 years old. At the start the building was only used by Škoda for gear production. But since privatisation, new machines were added, making everything more compact. The site is also limited by our 50t crane. We would like to keep the shape of the factory and do some reconstruction. There was a plan and a proposal in 2009 but the financial crisis stopped the project. So now we are waiting. We might start the project in 2019.

***GC:* What are Wikov Gear's goals in the short and long term with regards to the cement industry?**

TZ: We still aim to become a member of a big OEM in Germany. To work with different end users is nice but it takes lots of time because it's one project at a time. But when you work with an OEM, it sells the complete line. It definitely brings more aftermarket activities because the end users will need spare parts. It is easier to go to one OEM with a standardised gearbox than different variations.

***GC:* How do you think Wikov is perceived within the global cement industry?**

TZ: I think they view Wikov as Škoda and many people view the Škoda brand highly. Then they think about our location near to Germany and our price. Our flexibility is also unique. We can make a decision in hours on a customer request to give the customer our standard solutions but we can also modify them to a very high degree. We can be very specific and very accurate with it.

***GC:* Gentlemen, thank you for your time.**

All: You are very welcome indeed!

References

1. Steiner, L. *'Spassk Cement - Higher efficiency with a Wikov Side Drive,'* in *Global Cement Magazine*, October 2015.

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Chris Every & Miri Zlatnar, Coomtech Ltd

Coomtech presents innovative low-energy Surface Moisture Removal drying process

Low cost drying and clean fuels company Coomtech has developed an innovative and patented Surface Moisture Removal (SMR) drying technology for pulverised fuel ash (PFA) with significant benefits for the cement and building products industries.

Right - Figure 1: Air turbulence zones of Coomtech's test facility at the Wolfson Centre for Bulk Solids Handling at the University of Greenwich in Chatham, UK.

Right - Figure 2: Suspension zone of the Coomtech test facility.

Demand for PFA is increasing due to a number of benefits that it brings to cement and concrete producers. These include the fact that PFA increases cement performance, allows for more resistant, durable concrete and reduces the embodied CO_2 and cost of cement by lowering the clinker factor. Dry PFA can also be moved with ease pneumatically around a production site and blends easily with the other ingredients of the cement or concrete mixture.

However, there is currently an increasing shortage of PFA, particularly in the UK and elsewhere in northern Europe. This is due to the diminishing use of coal-fired power plants. Some companies dry PFA in-house using gas as an energy source. This is expensive and not ecologically sound. However, there is around 50Mt of *wet* pulverised fuel ash stockpiled in the UK alone, meaning that there is significant potential for this source to be used instead.

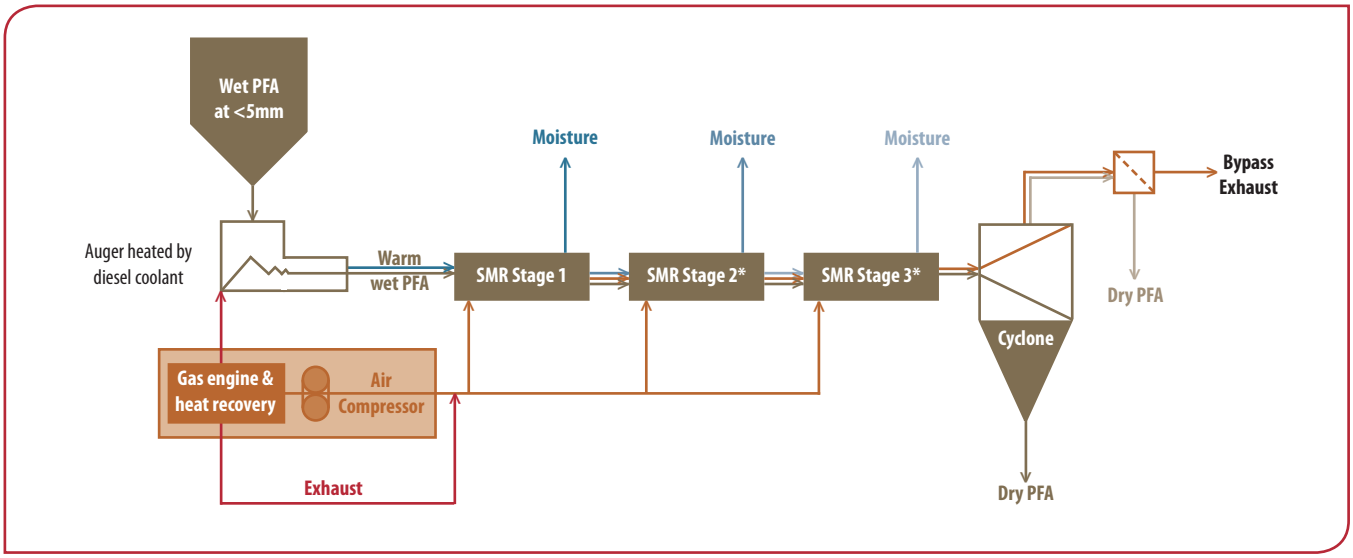
Coomtech SMR drying process

UK-based Coomtech Ltd has developed a low-cost drying technology for PFA which uses a gas combined heat and power plant to generate both power and increase the moisture carrying capacity of the air. This can save 20-25% of the cost of traditional thermal drying, assuming 80% thermal efficiency.

The Surface Moisture Removal (SMR) drying system is a simple, non-thermal, mechanical process that involves feeding PFA into a tubular device in a stream of high velocity, low pressure air. At the same time a supplementary, high-velocity air is introduced to create severe aerodynamic turbulence. This shears any surface moisture that is present on the PFA particles. While it is not heated using a fuel source, the air in the system has a temperature of around 80°C due to the generating process. This temperature is not enough to dry through the latent heat of vaporisation but is enough to ensure the air in the system can carry the maximum amount of moisture possible.

The SMR system comprises individual components that are familiar to materials handling engineers everywhere and includes hoppers, feed valves, pipes, tubes, cyclones, catchment bag filters and containers. Around 80% of the SMR system consists of tried-and-tested off-the-shelf equipment, greatly reducing the engineering risk for commercial users.

The SMR process can remove moisture from PFA from more than 20% to below 3% or to clients' specific requirements. For some manufacturers' processes the moisture may be reduced to as low as 0.5% if required.



Above - Figure 3: Schematic of conceptual three-stage SMR drying process.

Figures 1 & 2 show Coomtech's test facility at the Wolfson Centre for Bulk Solids Handling at the University of Greenwich in Chatham, UK, at which the company constantly optimises the SMR system's efficiency, both for drying efficiency and throughput. The suspension zone and turbulence zones are shown. In the turbulence zone, the moisture is sheared from the PFA particles. In the moisture extraction zone moisture is released from the particles to the airstream, mainly as vapour and aerosol particles. Tests have shown that smaller particles lose surface moisture more easily than larger ones. The best results have been achieved when processing material particles of <5mm.

Current stage of development

The upscaling and industrialisation of trials at the University of Greenwich over the past two years has led to a throughput of 1.5t/hr for PFA, using two drying zones. The promise of the system has led Coomtech to the final stages of contract negotiations for the building of commercial-scale PFA drying plants for construction products and cement manufacturing companies in the UK and Europe as well as power generators in the UK for the forward sale of dried PFA into the cement and construction industries. Figure 3 shows a conceptual system for commercial use as a PFA drying system.

Future steps for the SMR system

Coomtech is working with Fairport Engineering (EPC contractor), Greenbank Engineering (pneumatic handling) and the University of Greenwich on a scaling-up programme for the SMR system. This has led to a modular design that will process from 50,000t/yr up to 0.5Mt/yr per modular unit. Coomtech and its partners are now at the final stage of discussions regarding commercial contracts for plants in the UK and Europe.

Other materials and technologies

While Coomtech has commercialised the SMR process for PFA, it also has a focus on drying coal and, in principle, any other bulk material that can be pneumatically conveyed, such as aggregates, waste streams, metal oxides and other organic and inorganic materials that have significant surface moisture. In the case of coal, the process allows the efficient combustion of lower grade coals.

Coomtech is also developing two other technologies that it expects to be available to the market in the next 12-18 months. The first is Inherent Moisture Removal (IMR). IMR is a globally-patented process that moves the inherent moisture within materials to the surface. SMR can then be used to remove the surface moisture. This has particular potential to upgrade use with low rank coals, lignite, wet biomass and other organic materials.

IMR uses a unique heating technology called Ohmic heating at around 275°C and low pressure. Ohmic heating uses the moisture in the material to provide the heat source and create thermo-chemical conditions for decarboxylation to occur. This avoids the efficiency losses of other processes and leaves the pores hydrophobic, preventing moisture from re-entering the pores.

For coal, the benefits of using IMR and SMR in combination are: Higher calorific value; Increased grindability; More efficient combustion due to lower moisture; Lower CO_2 emissions.

The second other technology is Trapped Moisture Removal (TMR). It is designed to push tightly-bound surface moisture to the surface of more fibrous or open-particle materials such as some sub-bituminous coals and other organic materials in situations where the drying process must not alter the structure. The details of this technology are not currently available due to Intellectual Property restrictions that will apply during development.

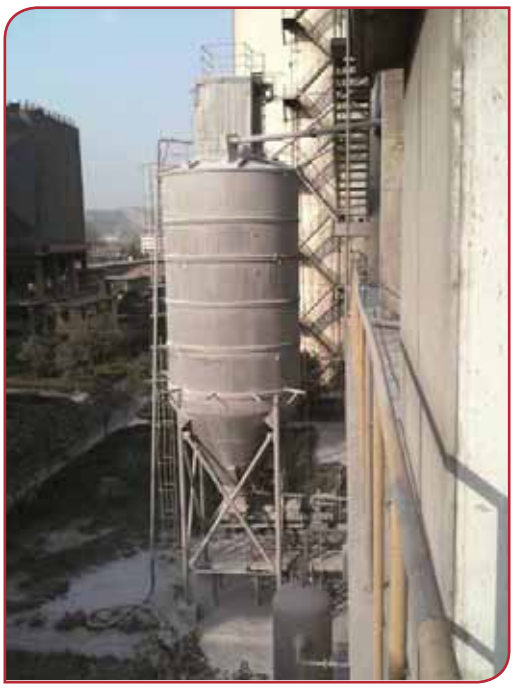
Joe Incontri, KROHNE, Inc.

New radar technology gives continuous accurate level measurement in cement plants

Joe Incontri of KROHNE, Inc. describes how his company's frequency-modulated continuous wave (FMCW) radar technology can significantly increase the accuracy, reliability and safety of measuring levels inside silos at cement plants...

A variety of issues affect accurate continuous level measurement in cement plants. The most critical concerns are dust, heavy build-ups, low-reflective media and uneven surfaces in conical and/or air-injected silos with internal objects. Now, new frequency-modulated continuous-wave (FMCW) radar technology, combined with high signal dynamics, offers a way to accurately and reliably measure product levels. One example of this new technology is KROHNE's OPTIWAVE 6300 C non-contact radar level. Within its measuring range of 80m, the device provides a ±3mm standard accuracy.

Moreover, due to its small antenna beam angle, tank internals or low reflective media are no longer an issue. To control the production and secure the supply of cement, the level sensor's measuring signal is transmitted to the control room, where the silo's level can be continuously monitored. The technology improves the supply inventory of remote cement silos and minimises inefficient loading and costly delays for the end-user.



Right: Non-contact FMCW radar level measurement in a cement silo.

Lower operating and installation costs

Installation and operating costs are significantly lower with new non-contact radar level technology. The two-wire radar needs less wiring, significantly reducing installation and operating costs. The level sensor is equipped with Pactware™ software and an installation wizard simplifies configuration. The device software uses dedicated algorithms to adapt each instrument to its specific application, making it particularly suitable for measuring uneven product surfaces. Expensive antenna aiming kits are no longer required. In addition, the drop antenna's shape and smooth surface made of polypropylene (PP) or polytetrafluoroethylene (PTFE/Teflon®), minimises build-ups. As a result, the 80/150mm antennas need less cleaning and do not require expensive purging systems.

Application in the cement industry

The new level measurement technology is used in several cement industry applications, including level measurement in cement silos, cement dust level measurement and fly ash measurement.

Level measurement in a cement silo

A cement silo's level must be continuously measured to control production and ensure the supply of cement to downstream products. At the site of one cement producer, where cement is stored in a large silo with a holding capacity of several thousand tonnes, operators found that the level did not decrease evenly as cement was removed from the bottom of the silo. Instead, deep pits formed as large chunks of product adhered to the silo walls. Moreover, the combination of a dusty atmosphere and low reflectivity (the dielectric constant was 1.8-1.9Σ_r) presented issues for the ultrasonic level measurement being used.

The ultrasonic device was then replaced with the new contactless level measurement device. The KROHNE radar level meter, with a nominal 150mm PP drop antenna, was placed directly on the silo's roof opening. As the antenna was not affected by the angle of repose, it did not have to be aligned. Installation was further helped by the device's pre-configuration, which only required uploading a few

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more parameters into the device, including silo height, block distance and cone shape.

In addition, the new device required less maintenance due to the lack of moving parts. The antenna's ellipsoidal and completely-enclosed shape, along with its smooth surface, minimised the need for dust protection, regular flushing and other periodic cleaning tasks.

Measuring cement dust levels

The technology was also used at a Chinese cement plant that uses ball mills to grind clinker. This process generates large volumes of cement dust, which is collected, stored and then fed back into the production cycle.

The 9m dust storage silos are equipped with air injectors, which fluidise the dust and prevent it from forming up on the silo walls. This simplifies extraction, but the injectors lower the dust's dielectric constant to $1.4\Sigma_r$. Combined with the dust-laden air, the lowered dielectric makes it more difficult to obtain a reliable and accurate level measurement.

Plant operators had previously tested ultrasonic time-domain reflectometer (TDR) and pulse radar devices, but found that none of these technologies could meet the cement plant's measurement requirements. To provide the required accuracy and reliability in level measurement, Krohne installed an Optiwave 6300 C level meter with a 150mm PP drop antenna and a 150mm flange connection. Fitted to the silo roof, the two wire FMCW non-contact radar continuously measures the dust volume left in the silo. Several months of testing showed the device worked well and the company equipped nine additional silos with similar measuring devices.

Fly ash level measurement

A US building materials producer previously used an ultrasonic level meter to monitor the amount of fine fly ash powder in a conical 6m wide by 20m high silo. However, the company found it difficult to conduct accurate measurements due to the low reflective medium in a dusty environment. The challenging product surface has a low dielectric constant ($3.3\Sigma_r$). There was also a tendency for the fly ash to build up on the silo walls and the level radar's antenna. This led to regular instrument failure, with subsequent process interruption. On several occasions, trucks were kept waiting for several hours.

The producer sought out a reliable level meter that has an approval for use in hazardous dust areas. It opted for the Optiwave 6300 C level sensor, installing the device with a 150mm PP drop antenna and a 150mm flange.

The 24-26GHz FMCW level meter generates a wave signal that enables the producer to accurately and reliably measure the product level in the dusty fly ash silo. The measuring signal is transmitted by a 4-20mA signal to a control room, where the silo level is constantly monitored. With the new level measurement technology, inefficient loading and costly delays due to false level indication are no longer an issue. In addition, workers no longer need to climb to the top of the silo to clean the sensor, thus substantially improving worker safety.

Improved performance

Non-contact radar level meters incorporate technology that is not impeded by the dusty environment of cement storage facilities. In addition, accurate and reliable product level measurement is not affected by internal structural objects and build-ups in silos.

Above left: Air injectors increased the challenge of providing accurate and reliable level measurement.

Above: The Optiwave 6300 C non-contact radar level meter.

Left: Optiwave 6300 C on a cement silo.

Dr Stefan Seemann, Stephan Rebettge & Dr York Reichardt, KHD Humboldt Wedag

Comparison of roller presses and vertical roller mills for slag grinding

The brittle nature of granulated blast furnace slag (GBFS) makes the material particularly efficient to grind in a roller press. Here authors from KHD Humboldt Wedag compare the company's systems to a vertical roller mill.

For many decades granulated blast furnace slag (GBFS) has been used as a replacement for clinker in the cement manufacturing process. Normal slag cements typically contain 40-70% GBFS, although some special products can contain more than 90%.

GBFS is a byproduct of the reduction process in the production of raw iron. The latent hydraulic properties of finely ground GBFS, as well as its low development of heat of hydration during setting, makes GBFS cement perfectly suited for massive concrete constructions such as foundations and dams. GBFS cement is also increasingly used in road construction, for example in India.

In the production of ordinary Portland cement (OPC) efforts to reduce embodied energy are focussed on the kiln because OPC contains almost 100% clinker. In contrast, the focus for reducing embodied energy in GBFS cement is the grinding step. This is because GBFS is already available as a by-product from iron production. The glassy structure of the GBFS results in highly efficient high pressure comminution.

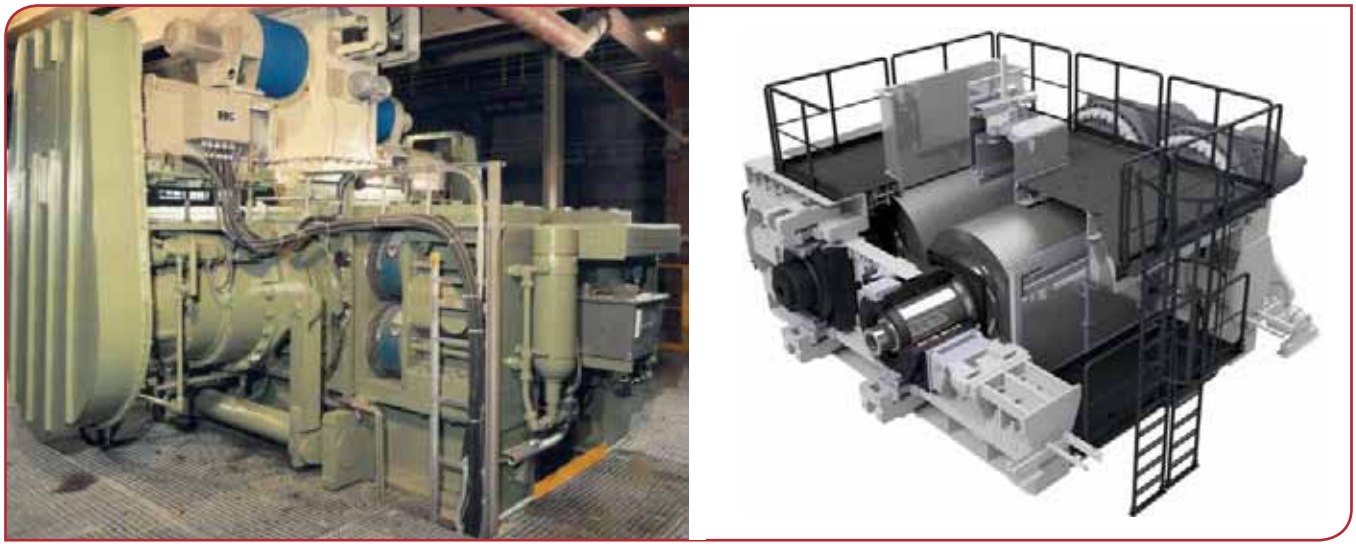
In 1977 Prof. Schönert of Clausthal University applied for a patent with the title, *'Method of fine and very fine comminution of materials having brittle behaviour.'* Based on his findings, in 1985, KHD put the world's very first industrial roller press into operation. This roller press was designed for granulated blast furnace slag and is still in operation. Since that time KHD has continuously developed the roller press into the most cost efficient method of comminution for raw material, cement and slag.

Roller press circuits

The roller press era started with a small machine with a diameter of 1m and a width of about 60cm (See Figure 1). Small motors where mounted on the roller press frame and the rollers were connected with V belts. At that time the requested capacities were small and could be handled with small roller dimensions.

Over the years the required capacities increased drastically, which influenced the development of larger grinding systems with high outputs. KHD serves these requirements with large rollers of up to 2.8m in diameter and grinding forces beyond 30MN. That machine grinds about 160t/hr of slag meal at a fineness of 4200cm²/g according to Blaine. An overview is presented in Table 1.

All roller presses have to be embedded in a perfectly-aligned machine surround. A static separator for deagglomeration, drying and coarse separation is nowadays an absolute standard in the roller press world. This separator type, known as the V separator, was invented by KHD in the 1990s. Furthermore, a



Below - Figure 1: 1st Generation roller press (left) and state-of-the-art roller press (right).

Grinding force (NM)	Roller dimensions (mm)	Raw meal (12% R90 µm)	Cement (3200cm²/g)	Cement (4000cm²/g)	Slag (4200cm²/g)
7	1700/900	160t/hr	65t/hr	35t/hr	35t/hr
10	1700/1100	200t/hr	80t/hr	45t/hr	40t/hr
13	1700/1400	260t/hr	100t/hr	60t/hr	55t/hr
16	1700/1800	340t/hr	135t/hr	75t/hr	70t/hr
20	2000/1800	420t/hr	180t/hr	100t/hr	95t/hr
24	2200/1800	500t/hr	215t/hr	120t/hr	115t/hr
27	2500/1800	600t/hr	260t/hr	145t/hr	140t/hr
32	2800/1800	700t/hr	300t/hr	170t/hr	160t/hr

Above - Table 1: Roller press standard sizes and capacities.

dynamic separator for the final cut point is needed, which KHD calls SKS. The necessary machinery is one point but the other is the arrangement of all components.

In 2007 KHD Humboldt Wedag pioneered an energy efficient and highly flexible comminution system that uses the roller press as the key piece of grinding equipment. Its name, COMFLEX®, is derived from COMminution and FLEXibility. COMFLEX® is the result of continuous development and represents the benchmark of modern roller press grinding technology, combining the roller press with a static separator and dynamic separator. To lower the building height, another arrangement was developed over the past three years. The GrindX® circuit operates without any bucket elevator and with a minimal civil structure. The unique design of both grinding solutions (See Figure 2) features a complete disconnection of separation and grinding to achieve the highest possible efficiency and other advantages that are described below.

Vertical roller mill circuits

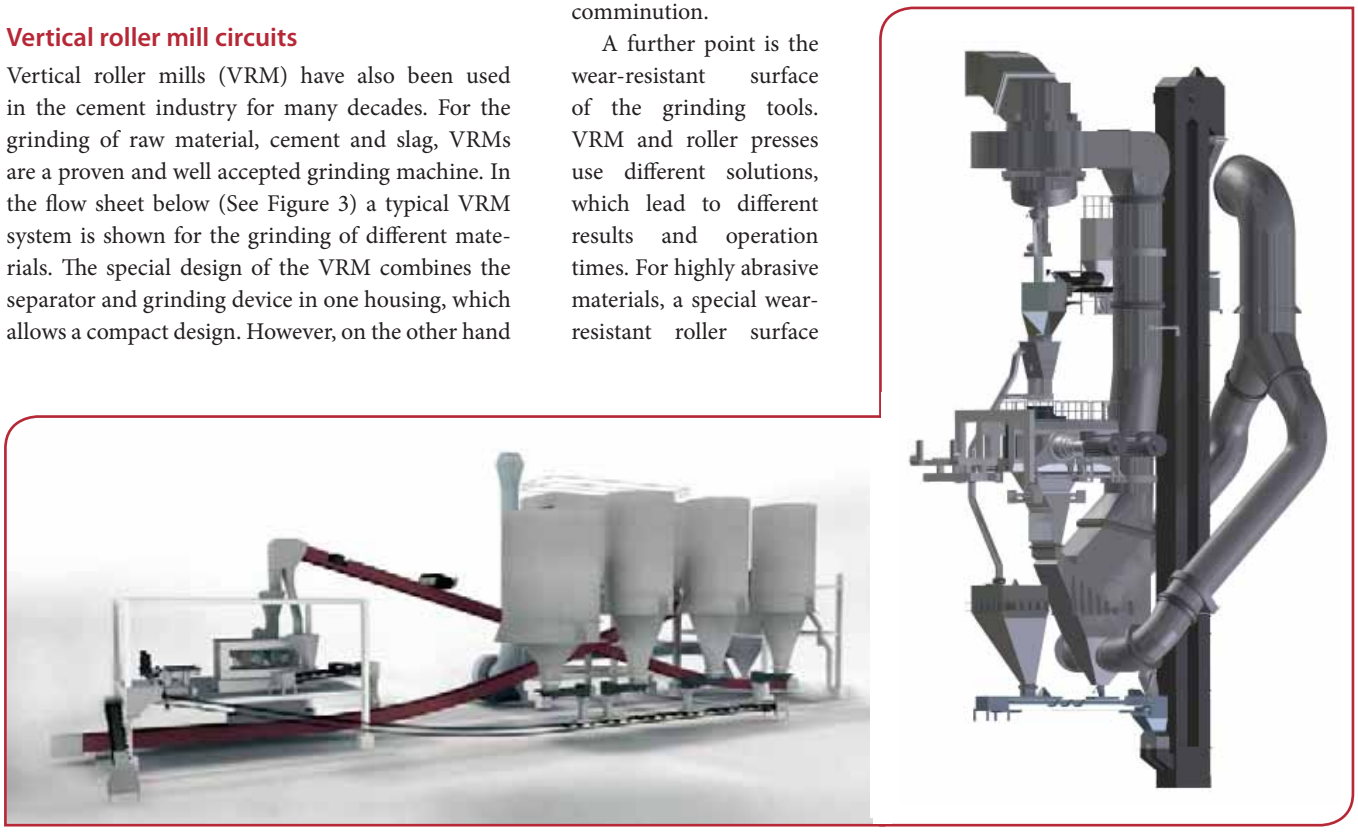
Vertical roller mills (VRM) have also been used in the cement industry for many decades. For the grinding of raw material, cement and slag, VRMs are a proven and well accepted grinding machine. In the flow sheet below (See Figure 3) a typical VRM system is shown for the grinding of different materials. The special design of the VRM combines the separator and grinding device in one housing, which allows a compact design. However, on the other hand this excludes the treatment of all material between separator and grinding device. This means that some material that falls through the nozzle ring is transported with belt conveyors and bucket elevators back to the feeding point of the VRM. Only that material can be treated with magnets to take out foreign particles.

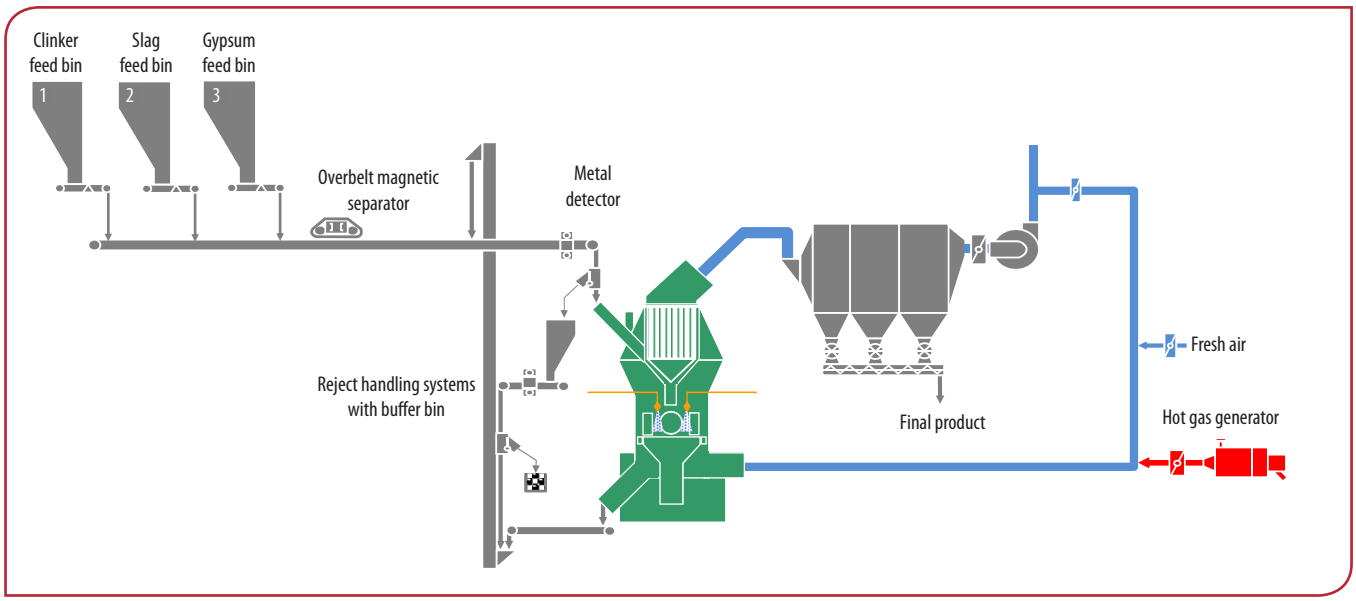
Handling of wear issues in both systems

A very high proportion of the wear in the system comes from the pig iron in the fresh slag and is dissected during the treatment with the grinding tools. The general concept of both grinding machines is completely different. The VRM recirculates almost all material (only a small proportion in the external recirculation can be treated with magnets) in the housing without any possibility to extract the pig iron. Conversely, the roller press circuit allows, after every grinding zone pathing an extraction of pig iron (and composite) with magnets. This leads to more efficient and less wear-intense comminution.

A further point is the wear-resistant surface of the grinding tools. VRM and roller presses use different solutions, which lead to different results and operation times. For highly abrasive materials, a special wear-resistant roller surface

Below - Figure 2: 3D Model of a GrindX® (left) and a COMFLEX® arrangement (right).





Above - Figure 3: Example of a vertical roller mill circuit.

was developed for roller presses, and has proven many thousands of hours of operation. This wear resistant surface is called stud lining. It features highly wear resistant tungsten carbide studs inserted into the roller surface, which allows for the formation of a protective autogenous wear layer. GBFS is pressed between the studs, covering and protecting more than 70% of the surface. With STUD lining, an operation without maintenance of up to 25,000hr is possible and a total roller life time of more than 40,000hr, even for a highly abrasive material like slag. Wear is less than 0.5g/t.

For comparison, VRM rollers are equipped with hard-faced surfaces, or more recently with composite materials and even ceramics. The reported wear rates are, however, 5-10g/t in the best cases. This means that hardfacing will have to be done 10 times or more to achieve 25,000hr of operation. As a result, several days of stoppage, costs for hardfacing and an increased risk of cracks must happen ten times more frequently than with a roller press.

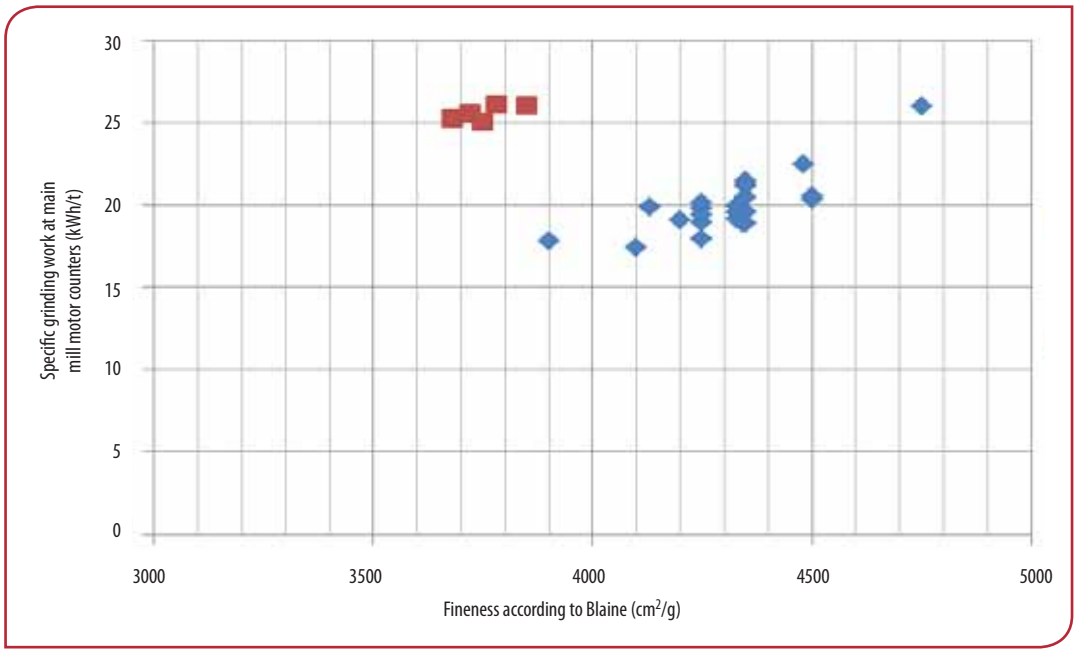
Right - Figure 4: Roller press with stud lining.

Comparison of grinding efficiency

In general it is difficult to conduct a real 'apple-to-apple' comparison of the efficiencies of different grinding methods, since slag properties, moisture, fineness, cement components or some other parameters are variable.

However, a Humboldt Wedag roller press was recently commissioned in a plant where a VRM was already installed. Both systems were installed to grind GBFS from the same yard and operators to a fineness of 3500-4500cm²/g according to Blaine. In Figure 5 the consumed electrical power of the grinding tool (table for the VRM and both rollers for the roller press) is displayed for different finenesses.

It is obvious from the figure that the roller press consumes less energy than the VRM at comparable fineness. In could be detected that the roller press circuit consumes a minimum of 3-5kWh/t less energy than the VRM to grind the slag to a fineness of 4000 - 4200 cm²/g. These data were collected during a very small time slot with the same feed material, which ensures very good comparability.



Right - Figure 4: Specific energy at mill main motor plotted against fineness.

Roller press ◆
VRM ■

Comparison of civil quantities

For a greenfield project several months back a VRM and a KHD roller press in finish grinding mode were offered to a customer that offered comparable outputs, fineness and compositions of the cements. These offers also considered the concrete and steel portions of the buildings. Looking at Table 2 it is clearly visible that the excavation cost of the VRM is particularly high, twice that of the roller press building. This is caused by the enormous foundations that are needed to install a VRM. Roller presses on the other hand need more structure above ground. This can be seen from the slightly higher amount of reinforced steel. Overall, it can be seen that the roller press civil costs are approximately 10% lower than the civil costs for the VRM.

Summary

KHD Humboldt Wedag has developed the roller press system over the past 30 years into the most energy-efficient and low-cost grinding system in the global cement sector.

GBFS grinding as a special field requires highly wear-resistant grinding tools and high pressure to comminute efficiently but not at the expense of excessive wear. Both advantages can be combined if granulated blast furnace slag is ground in a KHD Roller Press with stud lining. This machine, incorporated in a COMFLEX® or GrindX® system, represents the benchmark of modern roller press grinding technology for cement, raw material and granulated slag. As a result KHD is the undisputed market leader for slag grinding circuits.[1]

Reference

1. OneStone Research, March 2016.

Right - Table 5: Comparison of civil costs.

	Concrete		Steel		Excavation (m^3)	Formworks (m^3)	Civil price (Euro)
	Main (m^3)	Lean (m^3)	Reinforcement (t)	Structure (t)			
VRM	3260	190	158	796	4000	4760	2,676,964
KHD Roller Press	2250	120	170	702	2000	3520	2,362,232

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Nepal: Ghorahi orders Gebr. Pfeiffer mill

Ghorahi Cement has ordered a vertical roller mill from Gebr. Pfeiffer for its Kapilvastu Cement Udhyog grinding plant at Sonparwa, Barkalpure in Kapilvastu District. Ordinary Portland Cement will be ground on a MVR 3070 C-4 type mill with a capacity of 70t/hr. The mill will be equipped with a SLS 2650 BC classifier. The grinding plant can also be used for the grinding of mixed cements with granulated blast-furnace slag or fly ash.

The core components of the MVR mill and a 1250kW gearbox will be supplied by Gebr. Pfeiffer from Europe. The remaining components of the mill and classifier will be supplied by Gebr. Pfeiffer (India), which will also provide most of the components for the plant such as handling equipment for feed and take-away, plant filter, plant fan, hot gas generator, motors, frequency converters, proportioning belt scales and so on. The Indian subsidiary will also be responsible for any plant engineering. The scope of supply of Gebr. Pfeiffer also includes monitoring and coordination of erection as well as commissioning of the grinding plant. No value for the order has been disclosed.

Germany: Fuchs and DMG Mori launch technology partnership

Fuchs Petrolub and DMG Mori have signed a contract for a technology partnership. The goal of the partnership is to jointly develop new lubricant solutions and services for machine tool applications. The plan also includes further progress towards the digitisation of production processes and condition monitoring of machines and plants.

"Use of the correct lubricant is decisive for optimal productivity when machine tools are used for intensive processing of components. In Fuchs, we are pleased to have acquired a globally-based technology partner, and together we want to continue expanding our technology- and service-excellence," said Christian Thönes, chairman of the executive board of DMG Mori.

DMG Mori manufactures machine tools with sales revenue of over Euro3.5bn. Fuchs develops, produces and distributes lubricants and related specialties.

France: Cem'In'Eu orders Intercem ball mill

Intercem has won an order to supply Cem'In'Eu with a cement grinding plant. Intercem will supply a Ø 3.20m x 10.00m EGL closed circuit ball mill with a IVS 62 vertical air separator. The groundbreaking ceremony for the unit will be held in October 2017 and the start of production is scheduled for April 2018.

The first compartment of the mill will be equipped with lifting liners to aid coarse grinding. The second compartment will be equipped with a three-step classifying liner system to provide ball sorting with a fine grinding action. An intermediate diaphragm will allow the adjustment of material flow levels to optimise material level in both compartments. The mill will be powered by a 1300kW side drive. Product collection will be arranged by direct separation using a 70,000m^3/hr air jet filter.

Intercem will be responsible for plant engineering and documentation, including mechanical, civil and electrical engineering, programming works and documentation, mechanical assembly works and their supervision as well as mechanical and process commissioning and the training for operators. No value for the order has been disclosed.

Cem'In'Eu is a new cement producer with projects planned for sites at Tonneins in Lot et Garonne, at Port Fluvial de Chalon-sur-Saône in Saône et Loire and at Port d'Ottmarsheim in Haut-Rhin. The company plans to invest around Euro20m at each site. It also has development projects in Poland and in the UK.

US: Holcim US proposes solar unit for Hagerstown cement plant

Holcim US has proposed a 10MW solar unit for its Hagerstown cement plant in Maryland. NRG Solar Hagerstown, a subsidiary of NRG Energy, will build the array and lease the site for 35 years, according to Herald-Mail Media. The solar unit could meet up to 20% of the plant's annual power requirements and the project is expected to last for at least 20 years. Construction is scheduled to start in the second quarter of 2018 and it is planned to last up to five months. No value for the project has been disclosed.

Portugal: Cimpor grows sales in first half of 2017 on back of Portuguese recovery

Cimpor's sales rose by 2.6% to Euro921m in the first half of 2017 from Euro897m in the same period of 2016. Recovery in the Portuguese market buoyed its sales, despite continued issues in Brazil, Egypt and Mozambique. Its earnings before interest, tax, depreciation and amortisation (EBITDA) fell by 2.6% to Euro166m from Euro170m due to non-recurring costs. However, the cement producer said that, excluding these, its earnings would have remained stable and would have even risen by 4% if CO_2 permits management had been disregarded. Its cement sales volumes fell by 2.7% to 11.5Mt from 11.8Mt.

Poland/Ukraine: Driven to disruption

A shortage of truck drivers may negatively affect cement sales in Poland. Vacancies for drivers have grown to the extent that even migrant workers from the Ukraine are unable to meet demand, according to the Polish News Bulletin newspaper. The exodus of drivers from the Ukraine has also reportedly impacted upon that country's cement market. Industry sources say that railway transport is unlikely to help the situation due to a lack of loading facilities. Cement production rose by 7% year-on-year to 9.4Mt in 2017. Cement sales are expected to reach 16.5Mt in 2017 and 17.5Mt in 2018.

UK: South Ferriby participates in EU research

Cemex's South Ferriby cement plant in Lincolnshire is participating in the European Union (EU) supported 'enhanced energy and resource efficiency and performance in process industry operations via onsite and cross-sectorial symbiosis' (EPOS) project. Designed to enable cross-sector industrial working, the project highlights case studies that exemplify ways for companies to use wastes from other industries to deliver greater efficiency, save raw materials and contribute to more sustainable processes.

The South Ferriby plant has worked with other companies, including the INEOS chemical company, to determine how waste from INEOS' production could be used as part of the cement manufacturing process. In addition Cemex Poland and Cemex Research Group in Switzerland will also represent Cemex in the project.

Above: The Cemex South Ferriby plant is located on the Humber Estuary in the north of England.

Germany: thyssenkrupp cuts 1500 jobs as part of restructuring plan

thyssenkrupp's Industrial Solutions division plans to cut 1500 jobs in operational areas as part of its on-going reorganisation process. Around two-thirds of these positions will be based in Germany. The reduction in jobs follows a previous announcement in July 2017 to cut 500 roles in administration, also mostly in Germany. The job losses are part of the division's 'planets' transformation programme, launched in 2016, which is intended to increase the business area's competitiveness.

"To ensure Industrial Solutions can compete in the market over the long term, we need a more efficient and effective set-up. That goes for our cost structure and for our global presence. Although new orders have recovered from their trough, our structures are still oversized measured against orders in hand and our medium-term requirements. We must be able to respond more flexibly to fluctuations in order intake," said Peter Feldhaus, chief executive officer (CEO) of thyssenkrupp Industrial Solutions.

Germany: Intercem to optimise raw meal handling system

Intercem Engineering has received an order to optimise the raw meal dosing at a well-known German cement plant. The plant currently doses raw meal using a bucket elevator. The material is then divided volumetrically into the two pre-heater strings by means of an air channel system. The heat exchanger is closed by means of two rotary valves.

The system will continue to be used for the realisation of the total flow rate. According to the bucket conveyor, the flow is divided by a controllable splitter. By means of air channels the material is supplied to two dosing bins. From the dosing bins, each individual strand of the heat exchanger is individually fed gravimetrically with raw meal by means of mass flow metering devices. The raw meal is then conveyed to the delivery site via a short pneumatic conveyor.

Intercem has taken over the task of measuring the relevant area in the heat exchanger building using a 3D scanner and the delivery, installation and commissioning of the process engineering system. The special challenge is the planning of the stand as well as the installation of the system without crane support, due to the height of the building.

Germany: VDZ expects German cement consumption to continue rising in 2017

The German Cement Works Association (VDZ) expects cement consumption to continue to grow in 2017. The pronouncement follows data showing that consumption rose by 3.2% year-on-year in the country to 27.5Mt in 2016. VDZ president Christian Knell attributed the growth to a high level of building activity and good weather. Looking forward to the rest of 2017, he said that housing and infrastructure projects are expected to support the growth of cement sales.

Italy: Buzzi Unicem announces purchase of 50% stake in Ecotrade

Buzzi Unicem has announced that it purchased a 50% stake in Ecotrade in early 2017. Ecotrade supplies industrial byproducts, such as fly ash and blast furnace slags, from power plants and steel mills to the cement industry with deliveries of over 2Mt/yr at its peak. The company is a member of the Italian Register of Environmental Operators and it has a national distribution network in Italy. Buzzi Unicem intends to use Ecotrade's expertise to expand its operations internally.

Above: Ecotrade engages in the distribution of a range of mineral byproducts, including ashes, slags and synthetic gypsum, within Italy.

Ireland: CRH's European Heavyside division stagnates so far in 2017

CRH's sales revenue from its Europe Heavyside division, which includes cement production, fell by 2% year-on-year to Euro3.35bn in the first half of 2017 from Euro3.41bn in the same period of 2016. The group described the situation in Europe as 'stabilising,' with market recovery reported in Ireland, France, Finland and Poland. However, its earnings before interest, taxation, depreciation and amortisation (EBITDA) remained static at Euro352m. Overall the group's sales rose by 2% to Euro13bn and its EBITDA rose by 5% to Euro1.18bn.

"We have had a satisfactory start to 2017 with stabilising trends in key European markets and EBITDA growth in the Americas," said chief executive Albert Manifold. "For the second half of the year, despite currency headwinds and continuing challenging conditions in the Philippines, we expect a continuation of the first half momentum experienced in Europe and EBITDA growth in the Americas, which will result in another year of progress for the group."

The group's America Materials division's sales rose by 6% to Euro3.17bn and its EBITDA rose by 15% to Euro288m. It reported that residential and non-residential demand increased and that publicly funded infrastructure activity remained stable in the US. However, its cement volumes fell by 1% due to declines in Ontario and Quebec, although this was partly offset by increases in the US market. In Asia the group's sales fell by 11% to Euro244m in part due to lower sales volumes of cement in Philippines, with falling prices and higher fuel and power costs.

Germany: CRH consolidates European lime business with acquisition of Fels

Ireland's CRH has acquired Fels, a lime and aggregate business, for Euro600m from Xella International. The purchase includes nine production locations in Germany, one in Czechia and one in the Moscow region of Russia, as well as over 1Bnt of limestone reserves. The assets will be added to CRH's Europe Heavyside division. The purchase is expected to make CRH the second-largest business in the European lime market. The acquisition has been funded by the sale of CRH's Americas Distribution business to Beacon Roofing Supply for Euro2.2bn.

Turkey: Soma orders 4000t/day KHD production line

Soma Çimento has ordered a 4000t/day clinker production line from KHD for its plant at Soma near Manisa. The contract includes engineering, equipment supply, and supervision of erection and commissioning, including KHD's Simulex plant simulation system, which will simulate the operation of the plant. Commissioning of the plant is scheduled for the spring of 2018.

The core components of KHD's new line are: a five-stage KHD Preheater with Pyroclon-R LowNO_x AF calciner, equipped with Pyrotop compact mixing chamber, tertiary air duct and Pyrobox calciner firing system; a Pyrorapid two-tyre rotary kiln, with a diameter of 4.6m; a Pyro-jet kiln burner; and a Pyrofloor clinker cooler equipped with a Pyrocrusher System.

This project will be the third commissioning of KHD's Low-NO_x calciner with Pyroloop Technology in Turkey. It will be KHD's 51st kiln line in Turkey. No value for the order has been disclosed.

UK: Two senior appointments at Hanson

Hanson Cement has made two senior appointments within its bulk division as part of the company's drive to improve customer service. Phil Matthew has joined as field sales manager and John Doolan has been promoted to key account manager. Phil and John will work together to strengthen new and existing customer relationships, reporting to Mark Hickingbottom, national commercial director – bulk products.

Phil Matthew was previously at AB InBev, where he held account and sales management roles. He will manage a team of six district sales managers and carry out internal training sessions in order to enhance customer service. John Doolan, who has 27 years' experience in the construction industry, will work in conjunction with Hanson's key account customers to set and deliver strategic plans.

Commenting on the appointments, Mark Hickingbottom, said, "Phil and John's combined experience and knowledge of the company will allow them to place Hanson's values at the core of their work, helping to deliver our goals of being the most customer-focused, responsible and reliable construction products supplier in the UK."

Left: Left to right: Mark Hickingbottom, Phil Matthew and John Doolan.

Europe: RHI and Magnesita make sales ahead of merger

RHI and Magnesita have announced divestment agreements ahead of their proposed merger. RHI has signed a contract with a European refractories supplier for an undisclosed sum regarding the sale of its dolomite business in the European Economic Area. The sale consists of the production sites at Marone in Italy and Lugones in Spain. Magnesita has entered into a definitive agreement with Intocast to divest its business related to the production and supply of magnesia carbon bricks produced at the company's Oberhausen plant in Germany for Euro20.3m. Both sales were required by the European Commission as part of the merger process.

"With the sale of the two sites, the combination of RHI with Magnesita is right on schedule," said RHI's chief executive officer Stefan Borgas with regards to his company's divestments "We expect the confirmation by the European Commission in the near future."

RHI signed a contract in August 2017 to sell its production sites at San Vito in Italy and Sherbinska in Russia that produce fused cast refractories for the glass industry. Production at the company's plant at Aken in Germany was stopped in the first half of 2017 for an indefinite period. RHI plans to sell or close the plant to maintain its production utilisation rate across the business.

France: Fives becomes founding member of the Centre for Technologies, Minerals and Recycled Materials of the Future

Fives Group has revealed its membership of the Centre for Technologies, Minerals and Recycled Materials of the Future, a new association that aims to develop industrial recycling of minerals for the construction and public works sectors. Fives' Innovation Department and its subsidiary Fives FCB joined Team2 to found the association in May 2017.

The centre plans to set up a base to coordinate and test by-product valorisation, as well as the use of raw materials recovered from recycling, at a former cement plant owned by EQIOM group in Dannes, Pas-de-Calais. Fives' contribution to the research will include its technologies in crushing, grinding, classifying and pyroprocessing in the minerals industry.

Sweden: New Cementa CEO

Magnus Ohlsson has been appointed as the chief executive officer (CEO) of Cementa. Ohlsson has worked for Cementa and its parent company HeidelbergCement in various roles. Since 2014 he has been the Marketing Manager and Vice President of Cementa. He will continue to manage marketing in his new position. He succeeds Jan Gånge who will become the Finance Director and Deputy General Manager for HeidelbergCement Northern Europe.

BEUMER Group GmbH & Co. KG

Aalborg Portland relies on the BEUMER Pipe Conveyor

Aalborg Portland A/S relies on alternative fuels and raw materials at its plant in Aalborg, Denmark. This article explains how a Pipe Conveyor from Germany's Beumer Group helps it efficiently move materials around the plant.

Aalborg Portland, part of Italy's Cementir SpA, uses alternative fuels in its main burner and calciner at its plant in Aalborg, Denmark. "In 2014 we decided to optimise and enlarge the existing system," explains Ole Strøm Hansen, project manager at Aalborg Portland. At that point the manufacturer transported the fuels to both calciners via long pneumatic conveying lines. However, the producer did not have an initially positive experience, as pneumatic conveying lines are very maintenance-intensive and are also susceptible to breakdown. "In addition, we intended to increase the capacity of the existing conveying line to 20t/hr per calciner," explained Hansen.

In a new concept, refuse-derived fuel (RDF) is transported for the calciner and the solid recovered fuel (SRF) to the main burner. The solution is to transport the alternative fuels from the storehouse to the rotary kiln area as well as the gravimetric feed of both the calciner and the main burner.

The decision was made to reduce the length of the pneumatic conveying line and to replace the remaining line by a mechanical transport system, but the manufacturer also wanted to install a completely new conveying line for the main burner feeding, with a capacity of up to 10t/hr. "We evaluated different variants of mechanical transport systems," recalls Hansen. Finally, the Danish company opted for a single-source solution from Beumer Group based on its innovative Pipe Conveyor technology.

Below - Figure 1: Beumer Group supplied a single-source system to Aalborg Portland to feed the calciner and the main burner with alternative fuels and raw materials. The main components are the Pipe Conveyors. They are fed via screw conveyors. **Source:** Beumer Group GmbH & Co. KG.

Ideal solution for each case

In order to support producers of cement in the alternative fuels and raw materials field, BEUMER Group has set up a complete business segment dedicated to alternative fuels systems. "Our know-how and our tailor-made systems permit us to offer an optimum support to our customers," said Tomas Hrala, project manager at BEUMER Group. "We have many years of good experience and we always consider customers' specifications". With this capability, the system provider is able to supply and install the whole chain from the acceptance and unloading of the delivery vehicle, up to the storing, conveying and feeding process of the solid alternative fuels for the specific user. The customer receives everything from one source, thus having a single contact.

Pipe Conveyor as hub and pivot

"Due to the different grain sizes and the various compositions of these alternative fuels, it was necessary to develop an individual system solution for each line," explains Tomas Hrala. To enable the transport of the pre-processed fuels from the storehouse to the calciner and to the main burner, Beumer Group supplied and installed one Pipe Conveyor as the heart of these systems as well as various pieces of accompanying equipment. "This conveying technology is eco-friendly and requires low maintenance," adds Hrala. "Its enclosed construction protects the environment from material releases and from dust emissions. Another advantage is the lack of dust development on the running line." Due to its ability to navigate curves, considerably fewer transfer towers are required compared to other belt conveyors, allowing for substantial cost savings for the customer. The Pipe Conveyor can be customised to the individual requirements of the situation.

Efficient single-source system

The delivery of the kiln-ready alternative fuel is carried out using moving-floor trailers. The material is unloaded and stored at the receiving station. Both lines receive the material transported by the moving floors modernised by Beumer Group from the existing storehouse. All transport systems supplied and the accompanying equipment is intertwined to

ensure steady fuel feeding. The Pipe Conveyor of the calciner has a diameter of 350mm, a length of 135m and can transport up to 50t/hr to an intermediate hopper with a volume of 35m^3. This hopper is equipped with an activator and two double discharge screw conveyors and distributes the material in two feeding and pneumatic conveying lines to both calciners. The two new pneumatic conveying lines to the calciner with rotary vane feeders and blowers were dimensioned and supplied by Beumer Group.

"However, during the constructional dimensioning of this system we were faced with a particular challenge," explains Hrala. The buildings in which the calciners are placed include an additional part known as the 'penthouse.' It supports, among others, the discharge station of the Pipe Conveyor, the intermediate hopper with the two double discharge screw conveyors and also both weigh belt feeders with the pneumatic conveying system. "From a static viewpoint, the penthouse had to be calculated trying to not exceed the available load application in the existing building," explains Hrala. "At the same time, the adjacent requested thoroughfares for plant vehicles had to be ensured."

The heart of the line for the main burner is a Pipe Conveyor with a diameter of 200mm and a length of 201m. It achieves a conveying capacity of 12t/hr and is equipped with a spillage scraper conveyor for minimising the cleaning, as well as a dedusting filter. The fuel feed of the moving floor in the storehouse to the Pipe Conveyor is carried out by a screw conveyor. The feeding system in the main burner building includes an intermediate hopper with a volume of 10m^3, also with activator and double discharge screw conveyor and a weigh belt feeder. In addition, there is a pneumatic conveying line with blower and rotary vane feeder.

"We are very pleased with both single-source systems," concludes Ole Strøm Hansen of Aalborg Portland. "The transport systems and the accompanying equipment is intertwined to ensure steady fuel feeding." Tomas Hrala continues, emphasising Beumer Group's role, "We could again demonstrate that we have substantial competence with regard to the handling of alternative fuels in the cement industry and that we can support our customers efficiently."

Top left - Figure 2: The feeding station of the Pipe Conveyor to the calciner. A take-up device has been installed at the rear.
Source: Beumer Group GmbH & Co. KG.

Top right - Figure 3: The two Pipe Conveyors: Beumer Group realises different system solutions for the various bulk materials.
Source: Beumer Group GmbH & Co. KG.

Above left - Figure 4: The Pipe Conveyor conveys the material directly to the rotary kiln. Curves can be easily realised during construction.
Source: Beumer Group GmbH & Co. KG.

Above - Figure 5: The penthouse is underneath the discharge station of the Pipe Conveyor of the calciner. The intermediate hopper with the activator and the two double discharge screw conveyors are positioned here.
Source: Beumer Group GmbH & Co. KG.

Below - Figure 6: The weigh belt feeder with the rotary vane feeder, including a blower, pneumatically conveys the material to the main burner.
Source: Beumer Group GmbH & Co. KG.

Robert McCaffrey, Global Cement Magazine

Loesche Symposium 2017: Celebrating 111 years

The vertical roller mill expert Loesche GmbH celebrated its 111th Anniversary at its headquarters in Düsseldorf, Germany on 6-7 September 2017. 528 registered delegates from 55 countries were in attendance, including *Global Cement*...

1: Dr Thomas Loesche welcomed 500+ delegates to the Loesche Symposium.

The Loesche Technical Symposium celebrating the company's 111th anniversary was started off by **Dr Thomas Loesche**, owner and managing director of the company, who gave a welcome to all of the 528 registered delegates from 55 countries around the world. **Rüdiger Zerbe**, managing director of Loesche GmbH, then outlined how the company hopes to 'evolve the future,' not only through advances in technology, but also through decreasing the capex of plants and through the optimisation of spare parts management. Sustainability will be addressed through lowering the clinker factor, through the use of alternative clinkers and through increasing the use of alternative fuels - to 90% thermal substitution rate (TSR) and beyond.

Jacques Glémarec, senior Vice President of LafargeHolcim, next spoke about LafargeHolcim's aims for the future. Increased use of alternative fuels and raw materials, new products and low or zero impacts on water were perhaps expected promises, but Jacques also announced a target of zero fatalities, and zero injuries, from the building of and operation of its facilities - including those workers delivering its products on the roads. The company also aims for 100% reporting of 'near misses.' These are bold and laudable ambitions, but as Jacques later confirmed to *Global Cement*, 'No other target is permissible.' In addition, Jacques Glémarec confirmed that a lower capex environment is coming down the road for LafargeHolcim, supported by digital information networks.

2: An eager international audience listening to one of the Symposium's 20 presentations.

Dr Jörg Krämer of Commerzbank next gave an overview of global economic trends. He started by saying that highly indebted state-owned companies are likely to weigh on growth in China. These represent 50% of investment, but only 20% of 'valued-added,' and Dr Krämer suggested that state-funded companies will progressively cut investment. Alongside an end to a Chinese house price boom, lower investment will hit the construction sector and cement demand. The US is in an economic 'sweet spot,' with full employment, low inflation and low interest rates. However, rate hikes are coming and the Federal Reserve is likely to start to effectively reverse its programme of quantitive easing (QE) later in 2017. He suggested that future 'deepening' of the EU will include the appointment of a finance minister for the Eurozone (with the authority to be able to borrow on behalf of the EU), European debt mutualisation, a common deposit insurance scheme and common Eurozone unemployment insurance. However, in the meantime, the ECB will start to taper its QE efforts starting from the end of 2017, with the first rate hikes forecast for mid-2019 (from -0.4% to -0.3%). Italy remains a worry, in that it is 'too big to (be allowed to) fail.'

Asif Boda, Managing Director of HSBC, London, gave an outlook of cement trends worldwide. He pointed out that the cement multiplier has reduced from before the crisis to now, reflecting changes in construction methods and hence the cement-

3: Dr Omar Bekri, General Director of Cemos Ciment, spoke about the company's use of a 0.18Mt/yr Loesche Compact Cement Grinding (CCG) plant for grinding imported clinker in Morocco.

The greatest potential reductions in CO_2 emissions are likely to come from alternative fuels with high biomass content, presuming that CO_2 capture and storage is economically impractical. Improvements in energy efficiency could cut CO_2 emissions by a further 10%, while the reduction of the clinker factor could reduce specific CO_2 emissions by another 10% at least. Alternative raw materials such as slag and fly-ash bring challenges, however, including reductions

4: Dr Dorival Tecco, General Manager of Global Services for Loesche, spoke on the topic of new benchmarks for modern grinding plants.

intensity of construction. In nearly every region worldwide, cement production capacity utilisation has dropped since 2000, with only the US seeing a strong and sustained increase in utilisation in the post-crisis period. Boda suggested that at least one third of the cement production capacity of Europe is now 'not needed.' Greenfield capacity is now uneconomic in many parts of the world (although brownfield and milling capacity may still be profitable additions). Cement prices worldwide have dropped from 2010 to 2015. Capacity additions have slowed and will continue to slow. Urbanisation is continuing, with an additional 1.1 billion people expected to live in cities by 2030, with the majority of these people expected to move into cities in the developing world. Growing global megacities will require large amounts of infrastructure to correctly function, and investment will take off again. Capacity utilisation rates should thus increase and prices and margins will improve. Asif Boda forecast slow growth in cement demand in Europe to 2020, stronger rates of 5% CAGR for the US but slower growth in South America (and contraction in Brazil), patchy (from low to high) cement demand growth in the countries of sub-Saharan Africa, 6-8% CAGR for India, but -2% to +2% CAGR for China on the basis of a 'managed decline.'

5: Dr Arif Bashar from DG Khan Cement in Pakistan spoke about the construction of the world's largest cement mill, a Loesche mill with the largest ever COPE drive and a 7.2m grinding table.

Shen Jun, chairman of Sinoma/Nanjing Design Institute, spoke about his organisation's capabilities in cement plant construction around the world.

Dr Regina Krammer of Loesche - and former editor of *Global Cement Magazine* - next explained the Barcamp discussion group concept to the collected audience.

Prof Dr Horst-Michael Ludwig of the Bauhaus University of Weimar next spoke about product trends in the global cement industry. Approximately 60% of the CO_2 emitted during clinker production comes from decomposition of limestone, while the rest is emitted from fuels and electrical consumption.

in early strength - although additives and/or ultra-fine grinding of supplementary cementitious materials (SCMs) can be used to mitigate this effect. The availability of SCMs is an issue, with only 300Mt of blast furnace slag (BFS), and around 900Mt of suitable flyash available, compared to a global cement production of around 6Bnt. Calcined clays may be used in the future as SCMs, with large amounts available, and no cyclical or seasonal variations in supply. However, to create a cementitious material, the clays must be calcined at 500-1000°C. Metakaolin is too expensive for use in cement, but cheaper 'dirty' clays such as illite and montmorillonite can be used instead, albeit with higher calcination temperatures. Prof. Ludwig briefly mentioned the LC3 cement concept, which combines high proportions of limestone, calcined clay and gypsum (and only 50% clinker) to produce a low clinker cement. He also mentioned Loesche's work on the thermal transformation of steel slag into clinker-like materials. Ultra-fine grinding of steel slag to 'uncover' ferrous-covered belite phases can accomplish much

6: Delegates in discussion during the popular Barcamp session.

7: Loesche's Pierre Wlodarzyk presented on the topic of a business model for fast market entry for cement producers.

8: Dr Jörg Krämer, Chief Economist of Commerzbank, gave delegates a run-down of the global economy and financial market outlook.

9: Ralph Viebrock, Loesche's Director for Customer Service, spoke about digital interaction and services for customers.

10: Thomas Fahrland, Loesche's Sales Director, presented on projects in the UAE and Bangladesh and also summarised the results of the Barcamp Session.

the same effect. In the case of X-ray-amorphous unreactive belite, reactivation by ultra fine grinding is not possible, so that the creation of this phase during slag solidification should be avoided through carefully-designed cooling trajectories. Work on alternative binders is ongoing, including on Novacem, Ternesite, Solidia, Calera and Celitement. A new type of binder, LTBB, based on the calcium and silicon system of minerals, is currently being developed. Ultra-high strength concretes can be made with lower water content, high cement content and high silica fume contents of above 200kg/t concrete (or by using ultra-finely ground blast furnace slag). Carbon-fibre-based reinforcements in concrete - instead of metal reinforcement - will require cement and concrete mixes with a lower pH value.

Dr Daniel Strohmeyer of Loesche reminded delegates that the industry's ultimate product is not clinker or even cement, but is in fact concrete. Setting time and strength development, workability and durability are the prime quality parameters of cement in its final use in concrete, all of which are influenced by and influence the water demand. Particle size distribution and particle shapes critically influence water demand, and can be controlled and modified by changing a number of operational factors in a vertical roller mill (VRM), including changing the grinding pressure, changing the height of the dam ring, varying the mill air flow or changing the classifier speed. Gypsum is a source of SO_3^{2-} ions, the availability of which in solution is important for cement crystallisation. Daniel pointed out the critical influence of gypsum dehydration to anhydrite on cement performance: low mill exit temperatures and short retention time will reduce dehydration to anhydrite, which may mean that an increased amount of gypsum is required in the final cement blend, or additional anhydrite. At the same time, clinker pre-hydration should be avoided, through reduction of water injection into the clinker mill and by reducing the dew point in the mill. Process stability is crucial to being able to control all other

11: Discussions on the busy AUMUND group stand.

12: Markus Peitzmeier of BEUMER answers a question from a visitor.

13: Discussions on the joint stand of Yara and Robecco, experts in gas provision and explosion prevention systems respectively.

14: Dirk Rünker (left) from industrial fan producer Venti Oelde handles a question from interested visitors.

15: Schenck Process' Klaus Rupp (right) answers a question.

16: Discussion at the RENK stand, producer of COPE drivers for Loesche mills.

17: N+P's Lars Jennissen (centre) answers a question about the company's range of alternative fuel products.

operational parameters. Daniel suggested that three new Loesche developments will help: a fourth-generation support roller; grit cone water injection onto the grinding bed, and flow optimisation in the already-advanced third-generation LDC classifier. He concluded with the astonishing statistic that in 2010, Loesche mills ground around 45% blended cements, whereas in 2017 Loesche mills create 58% blended cements - a clear trend towards greater sustainability and a lower clinker factor.

18: Bulk material handling expert Kreisel, celebrating 105 years in business, was also an exhibitor.

Dr Mathis Reichert of Loesche next spoke about the market demand for ever-larger grinding capacities, which has been driven by increasing kiln sizes, the use of SCMs such as slag and flyash (and fillers) and economies of scale (one bigger mill rather than two smaller mills). Dr Reichert explained how scale-up factors are based on mathematical models that originated in the 1960s and 70s, but which have been shown to still be valid even at the current very large scale of mills (which now include VRMs with table diameters of 7m (such as the recently-commissioned LM 70.4+4 CS at Mfamosing) and beyond (such as the 7.2m table diameter mill at Hub in Pakistan which is currently being built). Dr Reichert outlined the COPE gearbox, co-developed with RENK, which incorporates 'active redundancy,' high efficiency, avoidance of critical parts and compact design and which he suggested is a perfect drive partner for the very largest mills. Mathis pointed out the advantages of using the same design and size of mill (the 'unification concept') for raw meal grinding and for clinker/slag grinding at the same plant, in terms of spare parts and maintenance expertise.

Dr Arif Bashir of DG Khan Cement Co. Ltd, Pakistan, next gave details of a project to build the most modern cement mill in the world, with the largest COPE drive, which will be commissioned in December 2017. The new plant has been built on the basis of anticipated future infrastructure investments, including the China-Pakistan Investment Corridor, and China's 'One belt, One Road' policy...

19: Renowned cement bagging machine producer Haver & Boecker was on hand to answer questions on its range of products.

20: Clinker cooler and kiln retrofitting company IKN had a busy stand.

Scan the QR code below or enter the bit.ly code into your browser to read more about the *Loesche Symposium* and to see the conference photo gallery...

See more http://bit.ly/2woCDt0

Peter Edwards, Global Cement Magazine

Cement in Turkey

Global Cement turns its attention to the rapidly-changing Turkish cement sector to coincide with the 14th TÇMB International Technical Seminar and Exhibition in Antalya, Turkey on 10-13 October 2017.

Turkey is a large democratic republic that lies at the crossroads of Europe and the Middle East. While 98% of its 75.9m inhabitants are Muslim, the country has a secular constitution that dates back to the founding of the modern country in the 1920s. As such, Turkey is the only majority Muslim country that does not have a state religion.

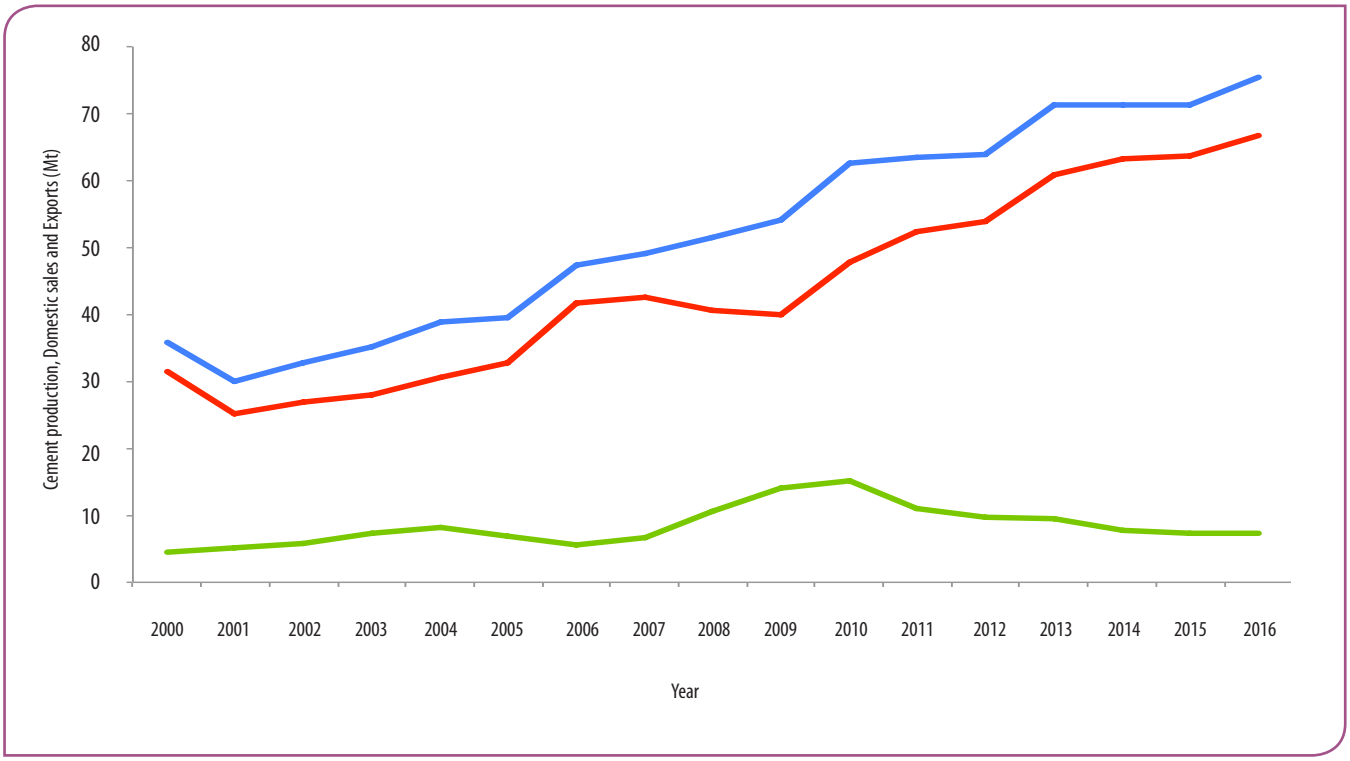
Turkey has an emerging market economy as defined by the International Monetary Fund (IMF) and had a GDP (PPP) of US$1.99tn in 2016, slightly up from US$1.93tn in 2015.[1] Its GDP/capita grew to US$24,900 in 2016 from US$24,500 in 2015. GDP was contributed to by the service sector (65.5%), industry (28.5%) and agriculture (6.1%). Turkey's labour force was 30.5 million in 2016, with unemployment having risen to 10.9% from 9.2% in 2014.

Turkey is a net importer of goods. During 2016, some US$207bn of goods, mainly machinery, chemicals, fuels and equipment, was imported. Although Turkey has a strong industry and production base, it relies on imported oil and gas for 97% of its energy needs. US$143bn of goods, primarily textiles, foods and garments, was exported in 2016. The country is also a massive exporter of cement.

Cement industry - Introduction

Turkey has 52 active integrated cement plants and 95.6Mt/yr of production capacity (Figure 12, Page 42), according to the *Global Cement Directory 2017*.[2] A further four integrated plants are under construction and five others are undergoing expansion, one of which is being relocated. Turkey also has 16 active grinding plants with >8Mt/yr of grinding capacity. (The production capacities of some of the grinding plants is unavailable.) The Turkish Cement Manufacturers' Association (TCMA) claims that Turkey had a total cement capacity of 132Mt/yr in 2016.[3]

Right: Istanbul is home to one of Turkey's most recognisable UNESCO World Heritage sites, the Sultan Ahmed Mosque (also known as the Blue Mosque). It has towered over Istanbul, Turkey's most populous city, since it was completed in 1616.



Above - Figure 1: Cement production, domestic sales and exports in Turkey, 2000 - 2016. The country has had negligible cement imports over this period.

Production
Domestic Sales
Exports

Source: TCMA.

Cement industry - 21st Century trends

Data from the TCMA shows a dramatic increase in cement production in Turkey since the turn of the 21st Century (See Figure 1 & Table 1). In 2000, when the national capacity was just 64Mt/yr, national production was 35.9Mt, of which 31.5Mt was sold domestically. As capacities rose across all regions, Turkish cement production rose to 75.4Mt in 2016, with 66.8Mt sold locally. Production has increased by 110% and domestic sales have doubled in just 16 years.

Turkey is one of the world's most significant cement exporters. This is due to a combination of large high quality limestone reserves, numerous deep, accessible sea ports and close proximity to both established and growing markets. It is able to supply high quality cement to markets in the EU, often undercutting Member States' domestic suppliers, and it can easily access Africa and the Middle East. In 2000 Turkey exported an impressive 4.5Mt of cement, mainly in bulk. Exports rose to 15Mt in 2010 before moderating to around 7.4Mt in 2016. In financial terms it was fourth in terms of cement exports in 2016 with 5.5% of all exported cement.[4] It took US$494.8m in foreign income. China, the largest exporter by this metric, provided 7.6% of the world's internationally-traded cement, gaining it an income of US$692.4m. Top destinations for Turkish cement exports in 2016 are shown in Table 3.

Figures 2-9 (Page 40) show the dramatic transformation in the Turkish cement sector over the period from 2000 to 2016 in

Region	Cement production Jan-Jun 2017 (Mt)	Domestic sales Jan-Jun 2017 (Mt)	Exports Jan-Jun 2017 (Mt)
Marmara	9.37	8.79	0.66
Agean	2.86	2.60	0.24
Mediterranean	8.70	5.59	2.84
Black Sea	4.16	4.06	0.15
Central Anatolia	5.78	5.76	0.00
East Anatolia	2.38	2.31	0.03
Southeast Anatolia	2.74	2.52	0.20
Turkey Total	**35.99**	**31.63**	**4.12**

Far left - Table 2: Cement production in Turkish regions for first half of 2017. **Source:** TCMA.

Year	Cement production (Mt)
2000	35.9
2001	30.0
2002	32.7
2003	35.1
2004	38.8
2005	39.5
2006	47.4
2007	49.2
2008	51.4
2009	54.0
2010	62.7
2011	63.4
2012	63.9
2013	71.3
2014	71.2
2015	71.4
2016	75.4

Left - Table 1: Cement production in Turkey, 2000-2016. **Source:** TCMA.

Above - Figure 2: Cement production by Turkish region in 2016. **Source:** TCMA.

Above - Figure 3: Cement production by Turkish region in 2000. **Source:** TCMA.

Below - Figure 4: Domestic cement sales by Turkish region in 2016. **Source:** TCMA.

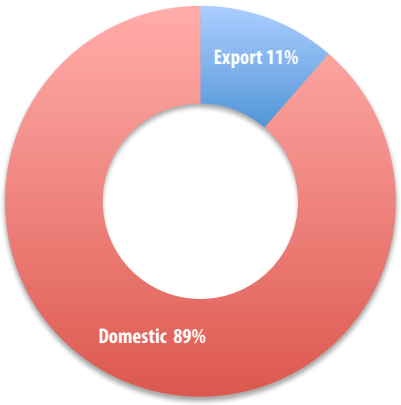
Below - Figure 5: Domestic cement sales by Turkish region in 2000. **Source:** TCMA.

Above - Figure 6: Cement exports by Turkish region in 2016. **Source:** TCMA.

Above - Figure 7: Cement exports by Turkish region in 2000. **Source:** TCMA.

Above - Figure 8: Cement capacity by Turkish region in 2016. **Source:** TCMA.

Above - Figure 9: Cement capacity by Turkish region in 2000. **Source:** TCMA.



Above left: Nuh Çimento, a major exporter of cement in Turkey's Marmara region.

Above - Figure 10: 11.4% of Turkish cement was exported in the first six months of 2017. **Source:** TCMA.

map form. One of the most striking aspects of the maps is the rise of the Mediterranean region as a production centre for exports. This has led to having the highest installed cement capacity, despite not containing Turkey's largest population centres. The regions that have changed the least are East Anatolia and South East Anatolia.

Cement industry - So far in 2017

In the first six months of 2017, Turkish cement production fell by 4.2% year-on-year to 36Mt compared to the first six months of 2016.[3] 31.6Mt was consumed within Turkey, also a fall of 4.2% and 4.12Mt was exported, a rise of 1.2% year-on-year.

The largest regional producer was the Marmara region, which made 9.37Mt (26%) of cement, closely followed by the export-reliant Mediterranean region, which made 8.70Mt (24%) (Table 2). Both regions produced less than in the first half of 2016, with Mediterranean production falling by 9.6%. The Mediterranean region exported 32% of the cement that it made. At the other end of the regional player scale, the Aegean, East Anatolian and South East Anatolian regions made the least cement, with 2.8Mt, 2.4Mt and 2.7Mt respectively.

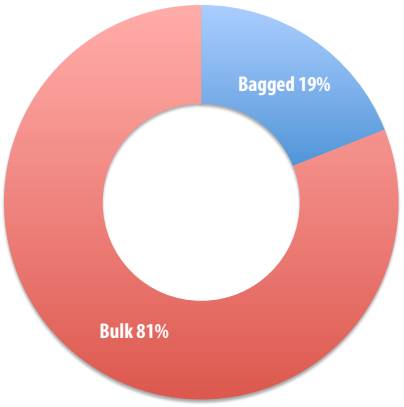
Cement industry - Producer breakdown

A map of Turkish cement producers is shown in Figure 12 (Page 42). The major producers are summarised in Table 4. There are a large number of producers, many of which are based in Turkey. The reason that there are so many cement producers in the Turkish industry is that no one company is allowed a larger than 25% share of the market. The apparent intention of this requirement is to keep competition in the industry high. The approach also results in an impetus for Turkish cement producers to expand and make acquisitions outside of Turkey.

The largest producer by installed capacity is OYAK Group, which has seven integrated plants that share 16.0Mt/yr of capacity. The company's main purpose is to manage the pension funds of the Members of the Turkish Armed Forces, the Gendarmerie General Command, the Coast Guard Command and others. It has a number of subsidiaries in the mining and metals sectors, including Adana Çimento, Mardin Çimento,

Country	Exports (Mt)
Syria	1.08
USA	1.02
Libya	0.83
Israel	0.60
Yemen	0.57
Colombia	0.34
Iraq	0.27
Ivory Coast	0.26
Sierra Leone	0.26
Georgia	0.25
Others	1.98

Above - Table 3: Destinations of Turkish cement exports in 2016. **Source:** TCMA.



Above - Figure 11: Bagged cement comprises around 19% of all Turkish cement sales, for both domestic sales and exports. **Source:** TCMA.

Rank	Company	Plants	Cement production capacity (Mt/yr)
1	OYAK Group	7	16.0
2	Akçansa (HC)	3	9.4
3	Limak Group	8	9.3
4	Çimsa Çimento	5	7.5
5	Aşkale Çimento	5	6.0
6	Nuh Çimento	1	5.7
7	AS Çimento	1	4.3
8	KCS	1	4.0
9	Medcem	1	3.2
10	Bursa Çimento	1	3.0
11	Votorantim	4	2.9
12	Cementir Group	3	2.1
13 =	Çimko Çimento	2	2.0
13 =	Göltaş Göller	1	2.0
13 =	Vicat Group	1	2.0
16	Batıçim Batı Anadolu	1	1.6
17 =	Sonmez	1	1.5
17 =	Adoçim	1	1.5

Left - Table 4: Turkey's largest cement producers in 2017 by installed active integrated cement production capacity. **Source:** The *Global Cement Directory 2017*. HC = HeidelbergCement.

Integrated cement plants Active capacity = 95.6Mt/yr

Aegean **11.3Mt/yr**
1. Batısöke Söke Çimento, Söke, Aydin 1.5Mt/yr (1.6Mt/yr u/c)
2. Çimentaş İzmir (Cementir), Izmir 3.2Mt/yr
3. Bakırçay Çimento, Isikkent, Izmir 1.0Mt/yr
4. Batıçim Batı Anadolu Çimento, Bornova, Izmir 2.0Mt/yr
5. Denizli Çimento Sanayi (OYAK), Honaz, Denizli 3.0Mt/yr
6. Afyon Çimento (Çimsa Çimento), Afyonkarahisar, Afyon 0.6Mt/yr
(Being upgraded to 1.3Mt/yr and relocated to Halimoru, Afyon)

Black Sea **8.5Mt/yr**
7. Votorantim Çimento, Çorum 0.5Mt/yr
8. Adoçim Çimento Beton (50% Titan), Tokat 1.5Mt/yr
9. Ünye Çimento (OYAK), Unye, Ordu 2.6Mt/yr
10. Aşkale Çimento, Trabzon 0.5Mt/yr
11. Bartın Çimento, Bartın 1.1Mt/yr
12. Akçansa Çimento, Ladik, Samsun 1.1Mt/yr
13. Ereğli Çimento (Sanko Group), Zonguldak 0.2Mt/yr
14. Bolu Çimento (OYAK), Caydurt, Bolu 1.0Mt/yr

Central Anatolia **13.6Mt/yr**
15. Çimsa Çimento, Niğde 1.2Mt/yr
16. Votorantim Çimento, Saraykoy, Yozgat 0.9Mt/yr
17. Çimsa Çimento, Agirnas, Kayseri 1.0Mt/yr
18. Çimsa Çimento, Eskişehir 1.0Mt/yr
19. Votorantim Çimento, Sivas 1.8Mt/yr
20. Konya Çimento (Vicat), Selcuklu, Konya 2.0Mt/yr
21. Votorantim Çimento, Elmadağ, Ankara 0.9Mt/yr
22. Limak Batı Çimento, Ankara 1.4Mt/yr
23. Baştaş Hazir Beton (Vicat), Elmadağ, Ankara 1.4Mt/yr (2Mt/yr u/c)
24. Limak İstaş İnşaat, Ankara 1.0Mt/yr
25. Bolu Çimento (OYAK), Kazan, Ankara 1.0Mt/yr
26. Kupeliler, Eskişehir 2.0Mt/yr (u/c)

East Anatolia **4.8Mt/yr**
27. Kars Çimento (Cementir), Kars 0.4Mt/yr
28. Akçansa Çimento, Askale, Erzurum 1.8Mt/yr
29. Aşkale Çimento, Van 0.6Mt/yr
30. YURTÇİM/ Yurt Çimento, Mus Merkez, Muş 1.0Mt/yr
31. Çimentaş Elazığ (Cementir), Elazığ 1.0Mt/yr

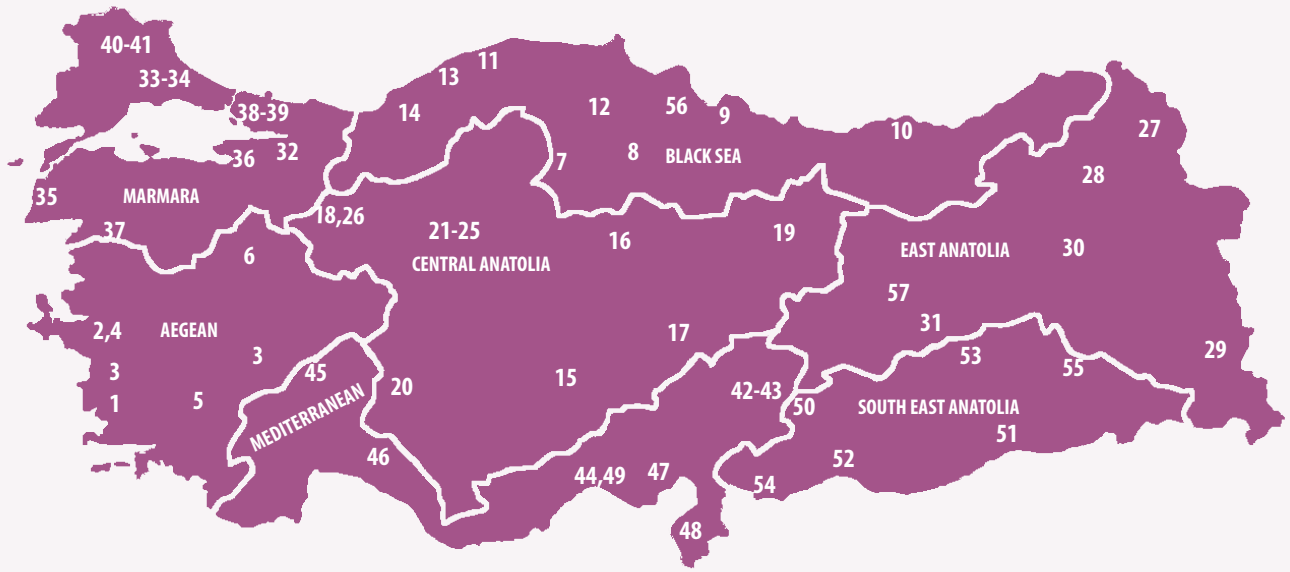
Marmara **24.5Mt/yr**
32. Aşkale Çimento, Bilecik 1.4Mt/yr
33. Akçansa Çimento, Büyükçekmece, Istanbul 2.8Mt/yr
34. Limak Batı Çimento, Kadikoy, Istanbul 1.0Mt/yr
35. Akçansa Çimento, Çanakkale 5.5Mt/yr
36. Bursa Çimento Fabrikası, Kestel, Bursa 3.0Mt/yr
37. Limak Batı Çimento, Balıkesir 1.0Mt/yr
38. Aslan Çimento (Oyak), Darica, Kocaeli 1.2Mt/yr
39. Nuh Çimento, Hereke, Korfez, Kocaeli 5.7Mt/yr
40. Limak Batı Çimento, Trakya, Kirklareli 2.2Mt/yr
41. Çimentaş Trakya (Cementir), Trakya, Kirklareli 0.7Mt/yr

Mediterranean **25.1Mt/yr**
42. KÇS Kahramanmaraş Çimento, Kahramanmaraş 4.0Mt/yr
43. Çimko Çimento ve Beton, Narlı, Kahramanmaraş 1.0Mt/yr
44. Çimsa Çimento, Mersin 2.3Mt/yr grey
1.1Mt/yr white
45. Göltaş Göller Bölgesi Çimento, Isparta 2.0Mt/yr (1.8Mt/yr u/c)
46. AS Çimento, Bucak, Burdur 4.3Mt/yr
47. Adana Çimento (OYAK), Adana 5.2Mt/yr grey
0.4Mt/yr white
48. Sönmez Çimento, Adana 1.6Mt/yr
49. Medcem Çimento (Eren Holding), Mersin 3.2Mt/yr

Southeast Anatolia **7.8Mt/yr**
50. Çimko Çimento, Adiyaman 1.0Mt/yr
51. Mardin Çimento (OYAK), Mardin 2.0Mt/yr
52. Limak Batı Çimento, Şanlıurfa 1.0Mt/yr
53. Limak Çimento, Ergani, Diyarbakır 1.4Mt/yr
54. Limak Çimento, Gaziantep 1.3Mt/yr
55. Limak Çimento, Slirt Yolu, Kurtalan, Siirt 1.1Mt/yr

Others under construction
56. Kavçim Çimento, Kavak, Samsun 1.6Mt/yr (u/c)
57. SYCS Çimento, Elâzığ 2.4Mt/yr (u/c)

Right - Figure 12: List of Turkish cement plants,according to *Global Cement Directory 2017*. u/c = Under construction.



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Denizli Çimento, Bolu Çimento, Ünye Çimento and Aslan Çimento, its cement units.

The second-largest cement producer in the country is Akçansa, a subsidiary of Germany's HeidelbergCement. It has three plants in the west of Turkey that share 9.4Mt/yr of capacity and include the 5.5Mt/yr export-led Çanakkale plant and the Büyükçekmece plant near Istanbul. Established in 1996, Akçansa is a joint venture between Sabancı Holding (39.7%) and HeidelbergCement (39.7%). The remaining 20.6% of shares are owned by private shareholders.

Limak Group is the third-largest cement producer in Turkey, with eight plants that share 9.3Mt/yr of cement production capacity. The company traces its history back to 1976 as Limak Construction and uses its extensive cement assets to support its activities in the construction sector.

Çimsa Çimento is the fourth-largest cement producer in Turkey. It has four active integrated cement plants that have 7.5Mt/yr of production capacity; its fifth integrated plant, Afyon Çimento, is currently being upgraded from 0.6Mt/yr to 1.3Mt/yr and relocated between two villages in Halimoru. Çimsa also has one 0.5Mt/yr capacity grinding plant in Ankara.

Aşkale Çimento is the fifth-largest producer in Turkey, with five integrated cement plants that share 6.0Mt/yr of production capacity. The company launched cement production in 1971, having been established in 1971.

Cement industry - Latest news highlights

March 2017: Bedeschi released more information about its contract with Sönmez Çimento to help build a clinker and cement export terminal in the Adana Yumurtalık Free Zone in March 2017. The contract was awarded in April 2016.

A slewing, luffing and travelling type shiploader, equipped with a telescopic chute, will be installed at the plant's port terminal. The shiploader will be able to load vessels of up to 55,000dwt and beam 32.2m. The nominal loading capacity of the machine is of 1000t/hr with a peak flow rate of 1100t/hr. The equipment will include de-dusting systems, such as filters, installed on board to reduce the dust pollution caused by material flow between belt conveyors.

May 2017: KHD was awarded a contract to upgrade Nuh Çimento's existing ball mill grinding unit in Hereke-Kocaeli in May 2017. With this upgrade, the plant will increase the grinding capacity from 212t/hr to 408t/hr at 4000cm^3/g according to Blaine. This will be the largest upgrade project to date for KHD. Commissioning is scheduled for the start of 2018.

July 2017: Brazil's Votorantim inaugurated a Euro140m upgrade project at its Sivas cement plant. The upgrade has seen the plant's cement production capacity rise to 1.8Mt/yr from 0.6Mt/yr. Prior to the investment the plant accounted for around 19% of Votorantim's production capacity in Turkey and once fully operational it will account for 42%.

August 2017: Soma Çimento ordered a 4000t/day clinker production line from Germany's KHD for its plant at Soma near Manisa in late August 2017. The contract includes engineering, equipment supply, and supervision of erection and commissioning, including KHD's Simulex plant simulation system, which will simulate the operation of the plant. Commissioning of the plant is scheduled for the spring of 2018.

Loesche has been awarded a contract for four mills for the plant: One 350t/hr raw material mill, one 30t/hr coal or 27t/hr petcoke mill and two 150t/hr clinker or granulated blast furnace slag mills.

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2. '*Global Cement Directory 2017*,' Pro Global Media Ltd., Epsom, UK, 2016.

3. http://www.tcma.org.tr/ENG/index.php?page=icerikgoster&menuID=38f.

4. http://www.worldstopexports.com/cement-exports-by-country/.

Below: A silo truck fills up at the Akçansa plant in Büyükçekmece.

Peter Edwards, Global Cement Magazine

The Russian cement sector

One of the BRIC group of rapidly-industrialising nations, Russia, and its cement sector, has grown steadily so far in the 21st Century. In the past few years economic growth has been dampened by economic sanctions, although the country's massive cement sector continues to adapt and modernise...

The Russian Federation covers the eastern 40% of the European mainland (to the west of the Ural Mountains) and almost the whole of northern Asia. It occupies over 75% of the Former Soviet Union, which was dissolved in 1991. Its vast area encompasses a huge range of climates and topographies, stretching from its border with Norway in the west to the Korean Peninsula in the east, and from the Black Sea to the arctic wilds of Siberia.

Around 76% of Russia's 144m-strong population live in European Russia, which is home to the capital, Moscow. Just 24% of all Russians live in Asian Russia at an average population density of 2.5/km^2, around 10% of the population density of European Russia.

Economy

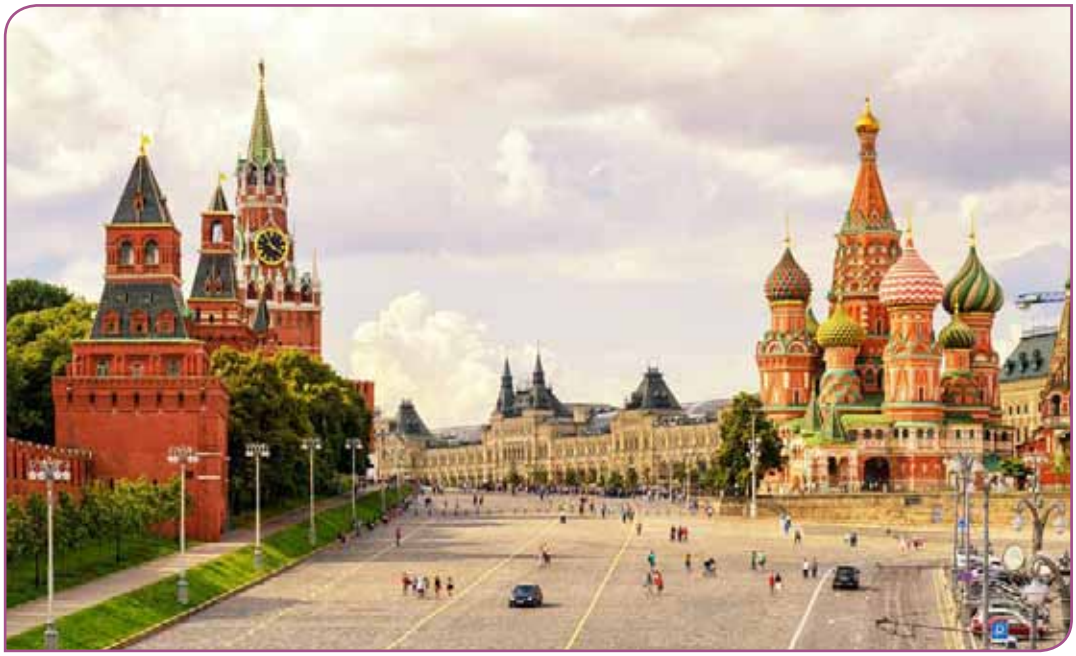
Following the break-up of the Soviet Union in 1991, Russia has been on an economic rollercoaster. Initially its economy was buffetted by the realities of adjusting to market economics, suffering a number of years of steep economic decline. The economy began to grow again in 1997, although fallout from the late 1990s Asian financial crisis affected oil prices and Russia's GDP until the end of the 1990s.

So far in the 21st Century, Russia's oil and gas wealth has ensured that the economy has grown strongly and GDP/capita is now around seven times that of 1990. Its economy has grown year-on-year to be the eighth largest in the world. The only year that it failed to grow in the 2000s was in 2008 when many of its trading partners entered the global financial crisis. However, despite more than a decade of economic growth, Russia's new wealth has not spread evenly across society and inequality has increased.

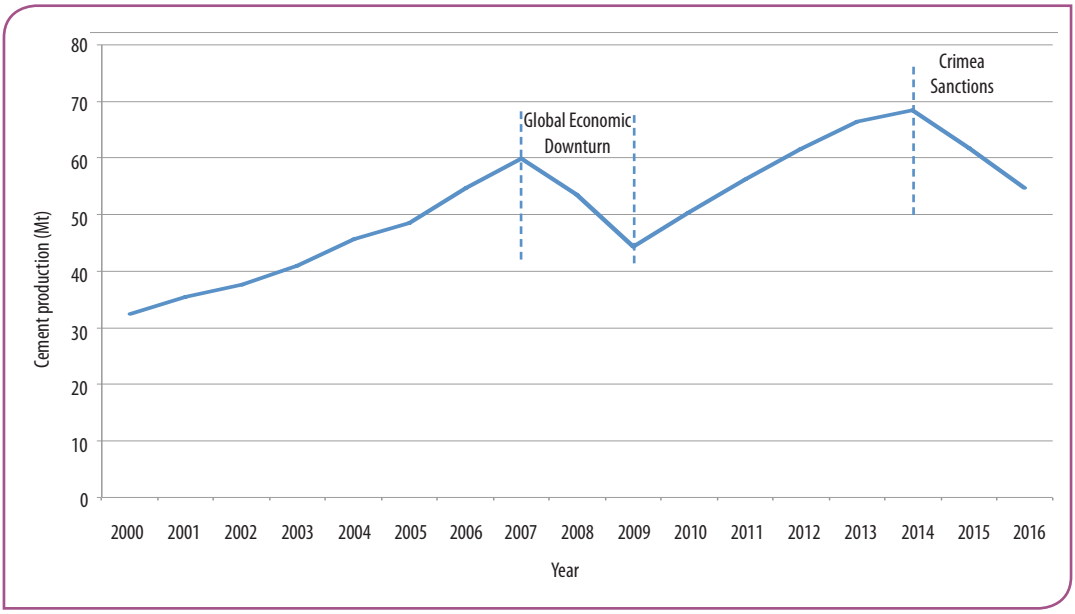
In 2016 GDP fell by 5.8% from US$1.37tn to US$1.28tn in 2015, which in turn was down by 33% compared to 2014's US$2.06tn. This is the result of the sustained lower oil price compared to the period before 2013 and the effects of US-led sanctions following Russia's 2014 annexation of Crimea and ongoing disagreement over the status of various territories in eastern Ukraine. The Russian economy has now contracted by 42% compared to its peak GDP of US$2.32tn in 2013.

Rollercoaster ride

The Russian cement industry, like many others around the world, was adversely affected by the 2008 global financial crisis. Many public and private



Right: Entrance to the Kremlin (left) and Basil's Cathedral (right) in Red Square, Moscow.



Left - Figure 1: Russian cement production, 2000-2016. **Sources:** USGS, Soyuzcement.ru.

construction projects were put on hold as average cement prices more than doubled from around US$82/t in the middle of 2007 to over US$162/t in the middle of 2008.

2009 saw a large decline in cement consumption but by the spring of 2010, the picture was beginning to improve. By the end of 2010 production was up on that seen in 2009, increasing to 50.4Mt. In 2011 a more significant increase of 10.3% was seen as cement production rose to 56.2Mt. This trend continued with another 10% increase seen over the course of 2012 to 61Mt and then into 2013, which saw an 8% increase to 66.4Mt. In 2014 production rose to 68.5Mt, before falling dramatically in 2015 to 61.7Mt and then to 54.7Mt in 2016.

Federal District	Production in 2016		
	1H	2H	Year
Central	7.4	6.8	14.2
Volga	6.4	5.5	11.9
Southern	4.7	4.2	8.9
Siberian	3.6	2.8	6.4
Ural	2.8	3.0	5.8
N Western	1.8	1.6	3.4
N Caucasian	1.0	1.5	2.5
Far Eastern	1.0	1.1	2.1
RUSSIA	**28.7**	**26.5**	**54.9**

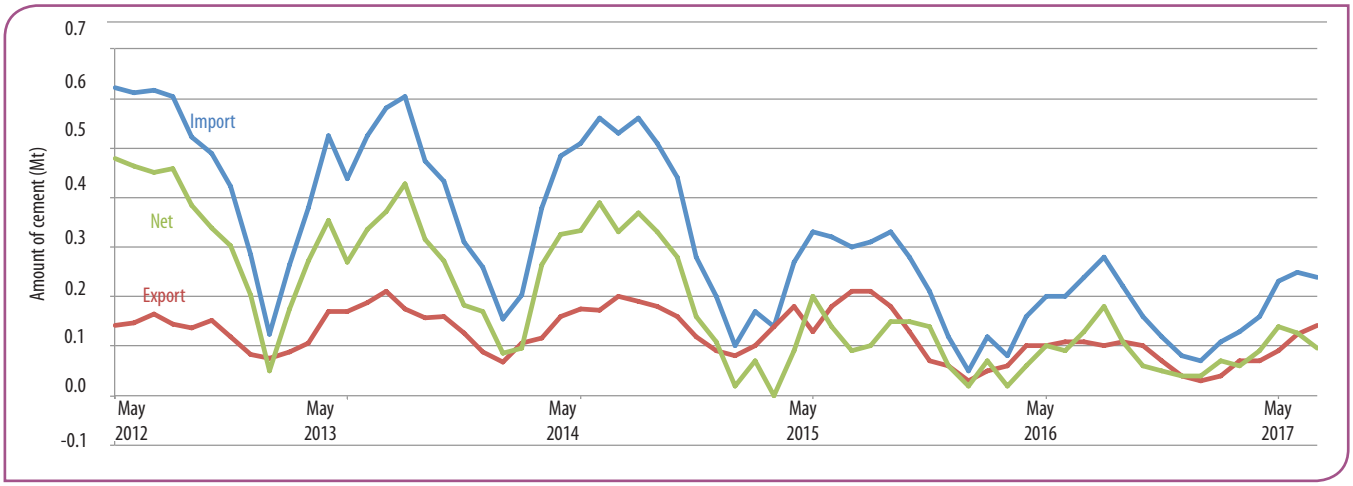
Left - Table 1: Production of cement in Russia in 2016 by Federal District. Rounded figures in Mt. 1H = First half. 2H = Second half. **Source:** Soyuzcement.ru.

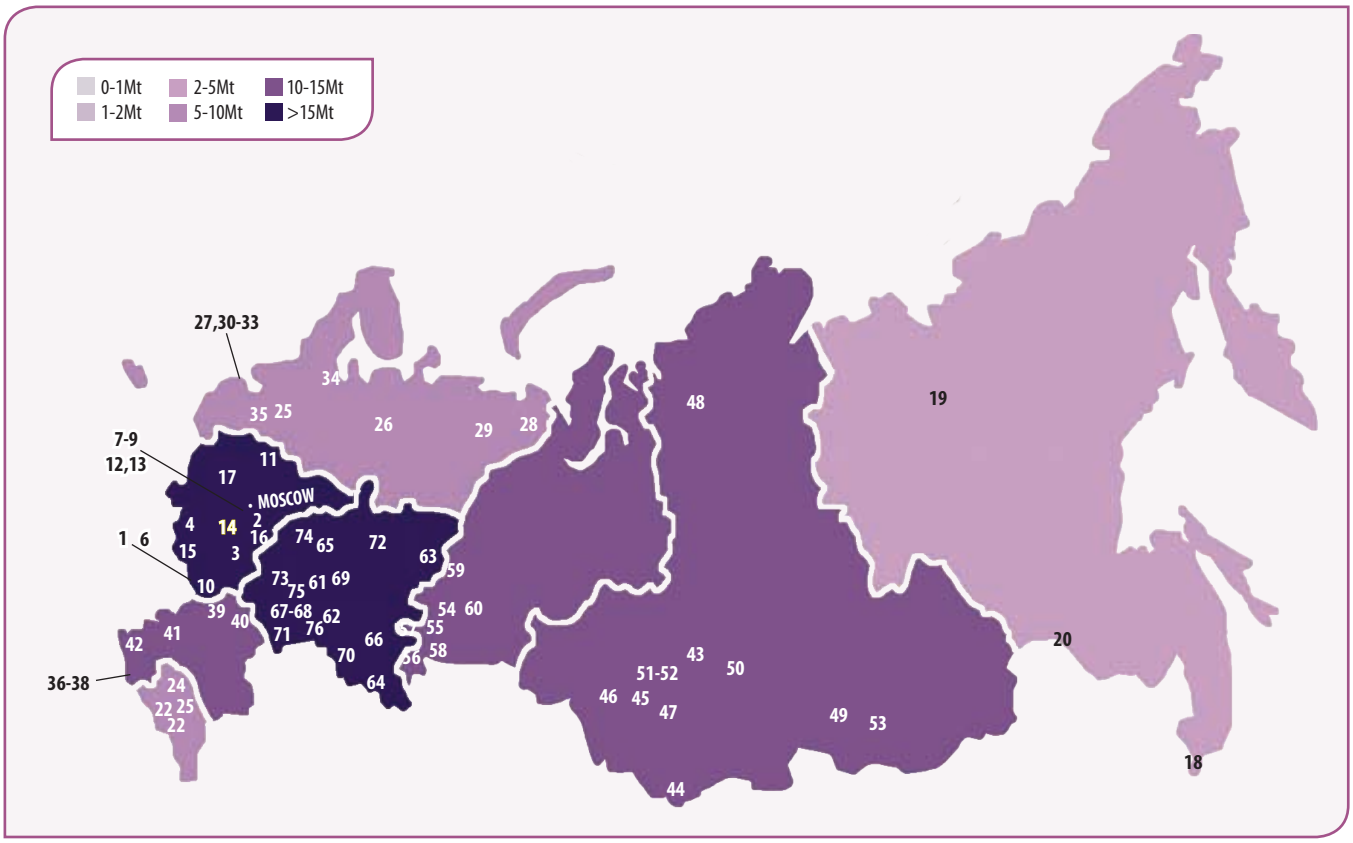
Trends in 2016

By District: All of Russia's Federal Districts saw cement production contract in 2016 relative to 2015. The Central Federal District was the top producer with around 14.2Mt, ~26% of the Russian total. The second-largest producer was the Volga Federal District with 11.9Mt (~22%). The third-largest producer was the Southern Federal District with 8.9Mt (~16%) of national production. More detail can be seen in Table 1, along with a breakdown of production for the first and second halves of 2016.

Imports and exports: Russia has moderate cement imports and exports relative to the size of its market. Figure 2 shows that, while it was a significant net importer in 2012 - 2014, the level of both has since dropped in line with lower demand. Russia imported 1.93Mt of cement in 2016 and exported 0.95Mt.

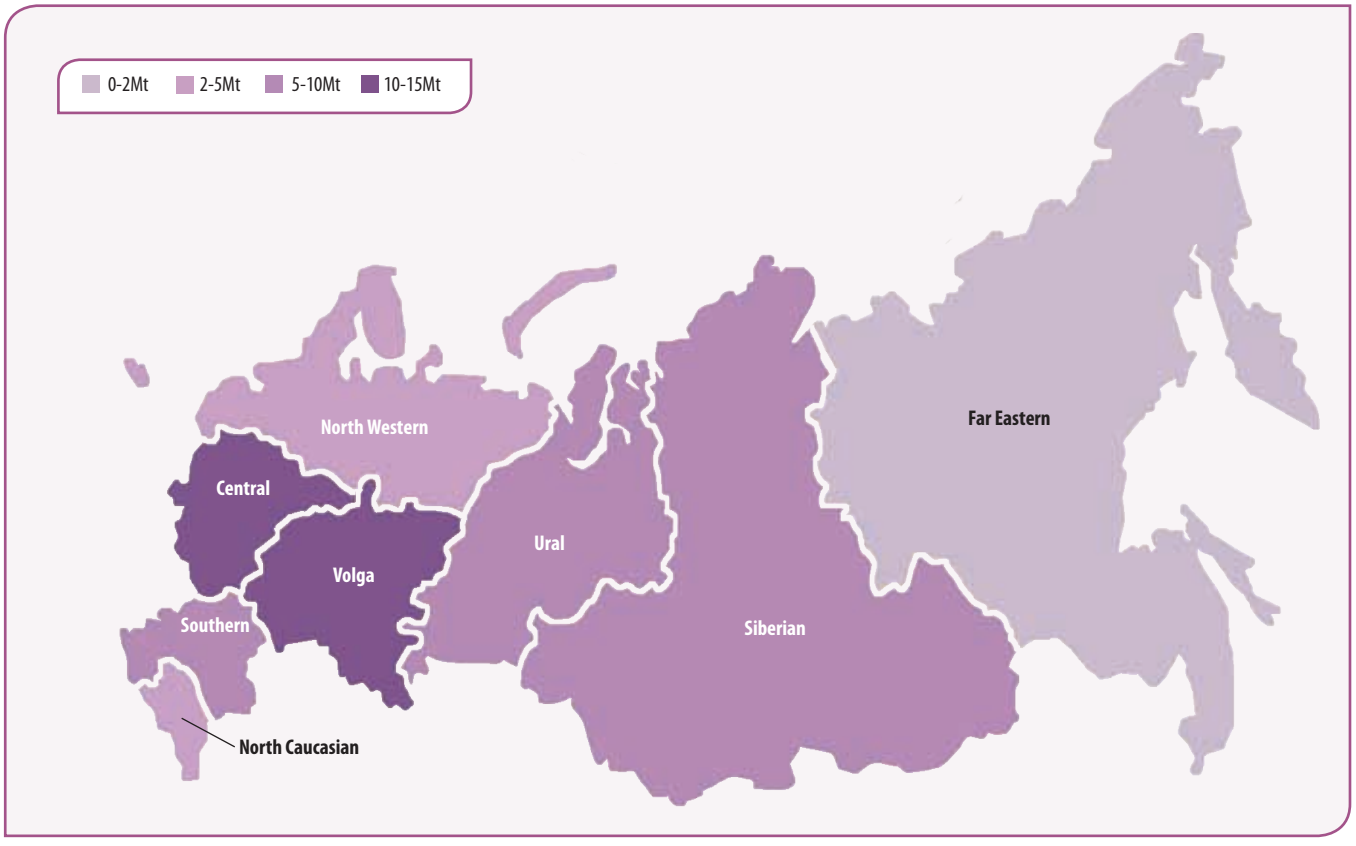
Below - Figure 2: Monthly Russian cement import, export and net import statistics for May 2012 to July 2017. **Source:** Soyuzcement.ru.





Above - Figure 3: Location of Russian integrated cement plants. Federal Districts colour-coded by cement production capacity. **Source:** *Global Cement Directory 2017*.

Below - Figure 4: Russian Federal Districts by cement production in 2016. **Source:** Soyuzcement.ru.



CENTRAL FEDERAL DISTRICT **Active Capacity = 25.4Mt/yr**

1. Eurocement, Belgorod, 3.8Mt/yr (Upgrading to 3.0Mt/yr Dry) (W)
2. Basel Cement, Serebryansky, 1.8Mt/yr (D)
3. Eurocement, Lipetskcement OJSC Plant, Lipetsk, 2.1Mt/yr (D)
4. Eurocement Company, Maltsovsky Cement Plant , Bryansk, 4.2Mt/yr (W)
5. Eurocement AG, Mikhailovcement OJSC Plant, 2.0Mt/yr (D)
(Upgrading to 3.6Mt/yr) (D)
6. Eurocement AG, Oskolcement Plant, Belgorod, 4.1Mt/yr (Upgrading to 3.0Mt/yr Dry) (W)
7. Holcim (Russia), Shurovsky Cement Plant, Kolomna, 2.2Mt/yr (D)
8. Lafarge Russia, Voskresensk, 1.3Mt/yr (Currently mothballed) (W)
9. Podolsk-Cement OJSC, Podolsk, 0.2Mt/yr (W)
10. Eurocement, Voronezh, 3.0Mt/yr (Under construction) (D)
11. Oryolstroy Tech, Verkhovsky, 1.5Mt/yr. (D)
12. HeidelbergCement, Tula, 2.0Mt/yr. (D)
13. Objedinennie Zavodi Gruppi, Moscow, 0.01Mt/yr (W)
14. Lafarge Russia , Kaluzksky Plant, Kaluga, 2Mt/yr (D)
15. Eurocement project, Bryansk (D)
16. Eurocement project, Ryazan Region (D)
17. Basel Cement, Achinsk, 1.4Mt/yr (D)

FAR EASTERN FEDERAL DISTRICT **Active Capacity = 4.0Mt/yr**

18. Spasskcement OJSC, Primorye Territory, 3.4Mt/yr (D)
19. Yakutcement OAO, Mokhsogollokh, 0.4Mt/yr (W)
20. Uglegorskcement, Project, 0.2Mt/yr (D)

NORTH CAUCASIAN FEDERAL DISTRICT **Active Capacity = 7.4Mt/yr**

21. Eurocement AG, Kavkazcement Plant, 3.0Mt/yr (W)
22. Karachaevo, Cherkessk Region, 3.1Mt/yr (Upgrade to 3.0Mt/yr Dry) (W)
23. Eurocement Group, Spasshoe Village, 1.3Mt/yr (D)
24. Eurocement, Karachay, 4Mt/yr (Proposed) (D)

NORTH WEST FEDERAL DISTRICT **Active Capacity = 8.1Mt/yr**

25. Eurocement AG, Pikalyovsky Cement Plant, Pikalyovo, 2.4Mt/yr (W)
26. Eurocement AG, Savinsky Plant, Arkhandelskaya, 1.3Mt/yr (Closed until 2018) (W)
27. HeidelbergCement, OAO Cesla, Slantsy, 1.2Mt/yr (D)
28. Vorkutinsky Cement Plant OAO, Vorkuta, 0.5Mt/yr
29. North Cement Co Ltd, Komi, 0.5Mtyr
30. Cement Co Ltd, Leningrad, 1.9Mt/yr
31. Metakhin JSC, Leningrad, 0.6Mt/yr
32. LSR Group, Slantsy, 1.0Mt/yr (D)
33. Eurocement project, Leningrad Region (D)
34. Eurocement project, Arkhangelsk Region (D)
35. Babinov Cement Plant JSC, Novgorod, 1.3Mt/yr (D)

SOUTHERN FEDERAL DISTRICT **Active Capacity = 13.3Mt/yr**

36. OOO Atakaycement OJSC (Inteko), Gayduk, Novorossiysk, 0.6Mt/yr (D)
37. Novoroscement OJSC, Novorossiysk, 2.0Mt/yr (D)
38. OOO Verhnebakansky OJSC, Krasnodarsky Krai, 2.3Mt/yr (D)
39. Eurocement AG, Podgorensky Cementnik, Podgornoye, 3.0Mt/yr (W)
40. JSC Sebryakovcement, Mikhaylovka, 2.4Mt/yr (W)
41. Sibirsky Cement Holding, Timluisk, 0.7Mt/yr (W)
42. Development at Verkhebakansky, 2.3Mt/yr (D)

SIBERIAN FEDERAL DISTRICT **Active Capacity = 12.6Mt/yr**

43. Achinsky Glinoziemskij Kombinat, 3.5Mt/yr (W)
44. Golukihinskiy Cement Plant, Altai, 0.3Mt/yr (W)
45. Alzem, Goluha, Zarinsky Region, 0.3Mt/yr (W)
46. Iskitimcement OJSC (RATM), Iskitim, 1.7Mt/yr (W)
47. Kuznetsky Cement Plant OJSC Kemerowski, 0.4Mt/yr (D)
48. Norilskaya Mining Co. OJSC, Norilskaya Plant, Norilsk, 0.8Mt/yr (W)
49. Sibirsky Cement Holding, Angarsk, 1.0Mt/yr (W)
50. Sibirsky Cement Holding , Krasnoyarsk, 0.9Mt/yr (W)
51. Sibirsky Cement Holding, Topki Village, 2.7Mt/yr (W)
52. Yashkinsky Building Materials Plant OJSC, Yashkino, 0.4Mt/yr (W)
53. Kamensky Cement Plant OJSC, Kamensk, 0.6Mt/yr (W)

URALS FEDERAL DISTRICT **Active Capacity = 13.0Mt/yr**

54. OAO Sucholoshskcement (Dyckerhoff/Buzzi Unicem), 3.6Mt/yr (D/W)
55. Teploozprsky Cement, Oblu, 0.9Mt/yr. (W)
56. Magnitogorski Cementno, Magnitogorsk, 1.0Mt/yr (W)
57. Eurocement AG, Katavsky Cement Plant, 1.6Mt/yr (D)
58. Uralcement Plant (Buzzi Unicem), Korkino, 4.5Mt/yr (W)
59. Eurocement, Nevyansk, 1.2Mt/yr (D)
60. Sukhologhsky Flux Meta Plant Co Ltd, Sverdlovsk, 0.2Mt/yr

VOLGA FEDERAL DISTRICT **Active Capacity = 26.8Mt/yr**

61. Eurocement, Ulyanovskcement Plant, Novoulyanovsk, 2.5Mt/yr (W)
62. Eurocement, Zhigulovskiye Stroymaterialy Plant, Samara, 1.9Mt/yr (W)
63. Gornozavodskcement OJSC, Gornozavodsk, 2.2Mt/yr (W)
64. Novotroitsky Cement Plant OJSC, Novotroitsk, 0.7Mt/yr (W)
65. OAO Mordovcement, Chamzinsky, 3.5Mt/yr (W)
66. SODA OJSC, Sterlitamak, 0.8Mt/yr (W)
67. OAO Volskcement (Holcim), Volsk, Saratov Region, 3.9Mt/yr (W)
68. Volsky Asbestos-Cement, Products OJSC, Volsk, 2.0Mt/yr (W)
69. Rosagropromstroy Corp. Regionreservcement, Sengily, 2.4Mt/yr (W)
70. South Ural Mining and Processing Co Ltd, Orenburg, 2.6Mt/yr (W) (D)
71. Industrial-Plust Co Ltd, Saratov, 2.0Mt/yr (D)
72. Pashiyskiy Metallurgical Cement Plant plc, Perm, 0.1Mt/yr (W)
73. Asia Cement, Penza, 1.2Mt/yr (D)
74. Nizhny Novogorod Cement Group, Nizhny Novogorod, 2.0Mt/yr (D)
75. Eurocement project, Ulyanovsk Region (D)
76. Eurocement project, Samara Region (D)

Wet line:	(W)	Under construction:	74
Dry line:	(D)	Proposed / Rumoured:	75

Over the course of 2016 the countries that Russia exported the most cement to were Kazakhstan (0.52Mt), Belarus (0.24Mt), Georgia (85,000t) and Finland (84,000t). The main import sources of cement entering Russia in 2016 were Belarus (1.44Mt), Kazakhstan (0.21Mt) and the Baltic States (87,000t).

Cement prices: Russian cement prices are seasonal, a direct consequence of the climate-based seasonality in production. Prices dip in January and February and then rise to a peak in late summer.

In the past two years, prices have been rising steadily in Ruble terms despite the relative lack of demand for cement. The summer peak price hit US$69.09/t

in June 2015. It rose to US$70.38/t in June 2016 and US$74.30/t in June 2017. Prices gained further ground in July 2017, when they hit US$75.67/t.

So far in 2017

In 2017 the Russian cement industry has continued to shrink in production terms. The first seven months of the year saw total production of 30.7Mt, a 3.6% year-on-year fall from 31.8Mt in the same period of 2016. If this rate continues, Russia will make 52.7Mt across the whole of 2017.

Table 2 shows production for each of Russia's Federal Districts in the first half of 2017 and 2016. Just two Federal Districts, the Volga and Far Eastern, saw increases in cement production year-on-year in the first half of 2017. The rest saw declines ranging from 2.0% for the North Caucasian Federal District to 18.9% for the North Western Federal District. Overall, Russian cement production fell by 3.0%.

Cement industry - Plants

The *Global Cement Directory 2017* lists 79 integrated cement plants as either active, under construction or planned. The 69 active plants share a capacity of 110.1Mt/yr. Most of the facilities are located within 1000km of Moscow. There are only seven in the two most eastern districts. They are shown in Figure 3 (Page 48).

This pattern is broadly representative of the distribution of Russia's population and hence its building activity. Larger towns and cities such as Moscow, St. Petersburg, Novosibirsk, Chelyabinsk and Nizhny Novgorod are associated with clusters of building activity. In recent years there has also been significant construction activity in the Black Sea resort of Sochi, which hosted the 2014 Winter Olympic Games and continues to be a source of developments surrounding tourism, such as the Formula 1 Grand Prix around the former Olympic Park.

Soviet apathy towards environmental protection combined with the perception that Russia's resources were free and effectively 'limitless' gave rise to a predominance of relatively-inefficient industrial installations by global standards. The cement industry was no different, with wet kilns the favoured technology for much of the 20th Century. This trend is now being reversed, albeit gradually, although wet capacity still accounts for 62% of all installed capacity. The *Global Cement Directory 2017* lists 37 wet plants. All of the plants that are under construction or planned are dry process lines. Eurocement is one player that is actively trying to replace its wet capacity, although the project has taken somewhat longer than anticipated.

Cement industry: The main players

The main cement producer in Russia is the holding company Eurocement Group, which has a total of 13 cement plants in Russia and a total capacity of 33.2Mt/yr. This represents 30% of Russian cement capacity.

As well as Eurocement, there are several smaller national players, including GK RATM, which owns Iskitimcement in the Novosibirsk Region, GC Park Group, which has three cement plants in the Far East Federal District and JSC Mordovcement, which has three plants in the Republic of Mordovia. Three multinationals have an interest in the Russian market. LafargeHolcim has three plants and a total capacity of 8.1Mt/yr. HeidelbergCement operates two plants, with a total capacity of 6.2Mt/yr. Buzzi Unicem operates two cement plants with a total capacity of 8.1Mt/yr.

Federal District	Production in H1		
	2016	2017	Δ (%)
Central	6.14	6.38	- 3.8
Volga	5.77	5.40	+ 6.9
Southern	4.11	4.22	- 2.6
Siberian	2.77	3.13	- 11.5
Ural	2.53	2.67	- 5.2
N Western	1.33	1.64	- 18.9
Far Eastern	0.97	0.91	+ 6.6
N Caucasian	1.00	1.02	- 2.0
RUSSIA	**24.62**	**25.37**	**-3.0**

Above - Table 2: Cement prodution by Federal District in the first half of 2017 and 2016.

Right: The Formula 1 Grand Prix track winds around the former Olympic Park in Sochi, Black Sea Federal District.

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Brazil: SNIC looks to 2018 for recovery

Paulo Camillo Penna, the president of the Brazilian cement association SNIC, predicts that the local industry will start to recover in 2018. His comments follow the publication of data for August 2017, according to the Valor Econômico newspaper. He added that the country would need four or five years of growth to resume the levels of 2014, the last year sales increased (to 71Mt). Sales of cement have been falling less steeply than previously but are still projected to end 2017 with a decrease of 7%. Sales are then forecast to grow by 1% in 2018 with a more rapid recovery expected to begin in 2019.

Uruguay: ANCAP in row over spare kiln

The Administración Nacional de Combustibles, Alcoholes y Portland (ANCAP) is reportedly unsure what to do with a spare kiln it owns. The state-owned oil and cement producer purchased the US$80m kiln for its Paysandú cement plant, according to the Uypress news agency. At present the parts and components are stored at the site.

ANCAP's union would like the kiln to be installed to secure cement supply at the plant. However, the company's cement division has built up a debt of US$207m over the past 15 years and it is expected to make a loss of US$15m in 2017. The cement producer plans to cut 60 jobs and make savings of US$20m by 2019.

Paraguay: INC installs new cement mill

Industria Nacional del Cemento (INC) has installed a new cement mill at its Villeta plant. Once fully operational the new mill will produce up to 80t/hr of a new product, CPC-40, according to the Hoy website. The cement producer aims to increase production by 45% by the end of 2017.

Guatemala: Cementos Progreso joins CSI as an affiliate member

Cementos Progreso has joined the Cement Sustainability Initiative (CSI) as its first affiliate member. The new membership level was created by the CSI to expand its membership and to provide an interim approach to joining the scheme. Affiliate members will be expected to achieve full membership within a three-year timescale.

US: Plibrico opens new HQ and R&D laboratory near Chicago

Plibrico Company has opened its new corporate headquarters and research and development laboratory in Northbrook, Illinois. Previously located in Chicago, Illinois, the new Northbrook location offers a larger, more user-friendly space for staff and visitors. The company is a manufacturer and installer of aluminosilicate and high alumina monolithic refractories that are used in a variety of industries, including the cement sector.

US: CRH to buy Ash Grove Cement

Ireland's CRH has agreed to buy Ash Grove Cement for US$3.5bn. The American cement producer operates eight cement plants across eight US states, combined with ready mix concrete, aggregates and associated logistics assets across the US midwest. Once shareholder and regulatory approval is obtained the deal is expected to be completed by the end of 2017.

"Ash Grove is an excellent addition to CRH's portfolio of businesses across North America as we seek to deploy our capital into high quality businesses that enhance our global asset base and provide opportunities to create shareholder value," said Albert Manifold, chief executive of CRH. "We welcome the Ash Grove team to CRH and look forward to further developing our longstanding relationship as part of one company."

Before the purchase agreement Ash Grove Cement was the largest domestically-owned cement producer in the US. The company has operated for 135 years and over a century of this time it has been run by the Sunderland family.

Chile: Cementos Fortaleza and Plycem to open cement plant

Mexico's Cementos Fortaleza and fibre cement producer Plycem will inaugurate a new plant at Barranca de Puntaneras by the end of September 2017. The two companies are part of Mexico's Elementia. No value for the plant has been disclosed.

US: St Marys Cement's Charlevoix plant construction period extension approved

The Charlevoix Township Board of Trustees has approved a request from St Marys Cement to extend a certificate allowing St Marys Cement more time to complete expansion work at its Charlevoix plant in Michigan. Votorantim Cimentos North America asked the local government body to extend its industrial facilities exemption certificate abatement by one year, as construction at the site is not expected to be completed until the end of 2018, according to the Charlevoix Courier newspaper. The cement producer plans to have the new systems at the plant running by mid-May 2018.

Upgrade work at the plant will increase its production capacity from 1.3Mt/yr to nearly 2Mt/yr. The cost has been budgeted at US$130m.

Canada: McInnis releases distribution plan for Atlantic Provinces

McInnis, formerly McInnis Cement, has released details about its distribution plan for the Atlantic provinces. The company has acquired two CRH Canada-owned terminals allowing it to access markets in New Brunswick, Nova Scotia and Prince Edward Island. McInnis says it will honour the orders of the clients supplied through those terminals and integrate their current employees. In addition, McInnis has entered into an agreement with CRH Canada and will supply cement for its terminals at Long Pond, Argentia and Corner Brook in Newfoundland directly from the McInnis plant in Port-Daniel-Gascons. Deliveries to Newfoundland will begin in the autumn of 2017.

"With the addition of these terminals to our network, we are now able to secure a solid position in this market" said Hervé Mallet, president and chief executive officer (CEO) of McInnis.

The McInnis distribution network includes several facilities: marine terminals in Providence, Rhode Island, US and Sainte-Catherine, Québec were the first to be built and commissioned. The Oshawa terminal in Ontario has started operation in September 2017. A railway transshipment station in New Richmond, Québec is also operational, and the Bronx marine terminal in New York, US will join the network in 2018.

Argentina/US: Loma Negra files for US$100m initial public offering

Loma Negra has filed for a US$100m initial public offering (IPO) on the New York Stock Exchange. The subsidiary of Brazil's InterCement wants to sell shares of Loma Negra in Argentina and New York to raise cash and cut debt, according to sources quoted by Reuters. Proceeds from the offering will be used to reduce debts at InterCement's parent company Camargo Corrêa. The Brazilian company originally purchased Loma Negra in 2005 for US$1bn.

US: PCA announces winners of John P Gleason Jr Leadership Awards

The Portland Cement Association (PCA) has announced the winners of the 2017 John P Gleason Jr Leadership Awards, honouring individuals who have exhibited leadership in association activities in support of member company objectives and operations. The awards will be presented at the PCA's Fall Congress in Chicago.

Daniel Nugent, Senior Vice President, Technical Services and Government Affairs, Buzzi Unicem USA won the award for Business Continuity for his leadership role in industry regulatory and legislative initiatives, including greenhouse gas emissions and other significant issues that impact cement manufacturing operations. He serves on a variety of PCA committees, including the Energy and Environment Committee and Government Affairs Council. Finalists for this award included Hamid Farzam, Vice President of Technical Services and Quality Assurance for Cemex USA and Steve Regis, Senior Vice President of Corporate Services for CalPortland Company.

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Matthew Wood, Sustainable Products and Promotion Manager, Ash Grove Cement Company, won the award for Market Development for the promotion of cement-based products at the national and local level, such as roller-compacted concrete and full-depth reclamation paving solutions. He is also a member of the PCA's Sustainable Development Committee and is a LEED Accredited Professional. Finalists for this award included David Gray, Market Manager for GCC of America and Larry Rowland, Manager of Marketing and Technical Services for Lehigh Hanson.

Ruben Guerrero Jr, Director of Corporate Affairs, Salt River Materials Group won the award for Young Leaders for his active engagement in the PCA's network of public policy and communications committees, including the Government Affairs Council, Industry Communications Committee and State Government Affairs Task Force. Finalists for this award included Desirea Haggard, Environmental Manager, CalPortland Company and William Kissel, Senior Environmental Manager, Titan America.

US: New CEO for Ash Grove

Ash Grove Cement has announced that its Chief Operating Officer J Randall Vance has been promoted to Chief Executive Officer. Charles Sunderland, who has held both the chairman and CEO titles, will remain as chairman of the Overland Park-based company.

Vance joined Ash Grove in 2011 as Chief Financial Officer, according to a release. In 2014, he was named as president and COO, filling a position that had been vacant since the death of Charles Wiedenhoft in 2010.

Cuba: Cement capacity underused

The Cuban cement industry is operating at a 58% capacity utilisation rate, according to the CiberCuba website. The low rate has been blamed on logistical and electricity supply problems.

Colombia: Moreno to oversee Sonson plant construction

Organizacion Corona has announced that its President Carlos Enrique Moreno will be replaced by Jaime Alberto Angel from October 2017 as head of the Corona Industrial division. Angel will oversee the construction of a US$400m cement plant in the Sonson Municipality of Antioquia, which the group is building as a joint venture project with Spain's Cementos Molins. The 1.35Mt/yr plant is expected to come online in early 2019.

Moreno said that the decision to split the company's management was due to the construction of the cement plant. Angel will also look after Corona's bathrooms and kitchens, materials and paints, energy and industrial supplies and tableware divisions.

Colombia: New Vice President of Legal and Institutional Affairs at Cementos Argos

Rafael Olivella Vives has been appointed as the Vice President of Legal and Institutional Affairs at Cementos Argos. He succeeds Juan Luis Múnera, who has secured the role as vice president of Corporate Legal Affairs at Grupo Sura. Olivella trained as the Universidad Pontificia Bolivariana and the Universidad de los Andes before working for Ignacio Sanín Bernal & Cía. He joined Cementos Argos in 2008 and subsequently became the vice president of Corporate Affairs at Celsia, the energy business of the Argos Group.

Bolivia: Work starts on Potosí cement plant

Imasa has started ground work on the US$300m Potosí cement plant near Chuitara following an inspection of the site. The 1.3Mt/yr plant is being built by Imasa, thyssenkrupp Industrial Solutions and Valoriza for Empresa Publica Productiva Cementos de Bolivia (ECEBOL), according to the El Potosí newspaper. Located at 4000m above sea level it will be one of the highest plants in the world when it becomes operational.

Guatemala: Alejandro Ramírez Cantú is new President of FICEM

The Inter-American Cement Federation (FICEM) has appointed Alejandro Ramírez Cantú, the chief executive of Cemex in the Dominican Republic, as its new president for the period 2017 – 2020 at its technical congress. He succeeds Gabriel Restrepo, manager of Institutional Affairs at Cementos Argos, in the role, according to the 7 Dias newspaper.

Ramírez Cantú is an industrial and systems engineer trained at the Tecnológico de Monterrey in Mexico and he holds a Master's Degree in business administration from the Wharton School of the University of Pennsylvania. He joined Cemex in 2000 and he has directed operations in Thailand, Puerto Rico, Costa Rica and the Dominican Republic.

US: EPA to consider changes to coal ash regulations

The Environmental Protection Agency (EPA) is considering making changes to the regulations managing coal combustion residuals (CCR), or coal ash, as non-hazardous waste under the Resource Conservation and Recovery Act (RCRA). The agency has granted two petitions to look at the existing rules.

"In light of the EPA's new statutory authority, it is important that we give the existing rule a hard look and consider improvements that may help states tailor their permit programs to the needs of their states, in a way that provides greater regulatory certainty, while also ensuring that human health and the environment remain protected," said EPA Administrator Scott Pruitt.

The current regulations took effect in late 2015 and manage how coal ash generated from electric utilities and independent power producers is managed and disposed of in surface impoundments and landfills. The rule also defines what constitutes beneficial use of CCR and, therefore, is excluded from the rule's requirements. Coal ash is used in a variety of industries including cement production.

South Korea: Four bidders short-listed for Halla Cement purchase

Four companies have been shortlisted to buy a full stake in Halla Cement. Asia Cement, Sungshin Cement, Aju Corporation and LK Investment Partners are all contenders for the sale, according to sources quoted by the Maeil Business Newspaper. Six investors submitted preliminary bids for the cement producer, and Halla Cement's largest shareholder Baring Private Equity Asia and its sales advisor Citigroup Global Market Securities Korea chose the final selection.

The shortlisted companies will have up to six weeks to conduct due diligence procedures before submitting final bids in early November 2017. The seller intends to pick a final bidder by mid-November 2017.

Baring Private Equity Asia and Glenwood Private Equity bought Lafarge Halla Cement from LafargeHolcim in mid-2016 for Euro427m.

India: JK to invest US$234m

JK Cement plans to invest up to US$234m over the next 3- 4 years on an expansion project to increase its cement production capacity by over 30% to 14Mt/yr. Rajnish Kapur, the head of the company's cement business, told the Press Trust of India that the cement producer is considering expanding existing plants and building new ones due to anticipated government infrastructure spending and a good monsoon. He said that it is in the process of evaluating expansion opportunities at its Mangrol plant in Rajasthan. It is also looking to build a new plant in Panna, Madhya Pradesh.

Cambodia: Plant cap proposed

The Cambodian government is planning to cap the number of cement production licences after the opening of two new cement plants that are expected to start operations by the end of 2017, according to Hort Pheng, director of the Industrial Affairs Department at the Ministry of Industry. Pheng made his comments to the Phnom Penh Post newspaper in relation to Chip Mong Insee, a joint venture between Chip Mong Group and Thailand's Siam Cement Group, and Battambang Conch Cement, a joint venture between Battambang KT Cement and China's Anhui Conch. The new plants will join the country's three existing plants operated by Kampot Cement, Cambodia Cement Chakrey Ting and Thai Boon Roong in Kampot province.

India: 100Mt/yr of excess capacity

The Cement Manufacturers Association (CMA) says that the local cement industry has 100Mt/yr of excess production capacity out of a total of 425Mt/yr. The sector is sitting on over US$9.4bn of 'sunk investment in surplus capacities' but the CMA expects infrastructure schemes including railway projects to increase demand, according to the Press Trust of India. CMA President Shailendra Chouksey added that initiatives such as the Mumbai-Ahmedabad bullet train could raise cement consumption by 3-5Mt/yr.

In separate comments M P Rawal, the company administrator of JK Cements, confirmed the CMA's assessment of the sector by saying that a slowdown in the construction industry in 2016 had led to a 70% utilisation rate of the country's cement plants. He expected the same situation to persist in 2017. However, he warned that 'one bullet train' was unlikely to have a big impact on the situation.

China: Anhui Conch revenue rises by a third

Anhui Conch's sales revenue rose by 33% year-on-year to US$4.79bn in the first half of 2017 from US$3.60bn in the same period in 2016. Its sales volumes of cement and clinker rose by 4.6% to 134Mt. Its gross profit rose by 37% to US$1.48bn from US$1.08bn. The cement producer attributed its result to 'significant' increases in prices and continued discipline with production and operation costs.

By region the company reported particular increases in sales in East and Central China due to increased sales volumes and prices. In West China it increased its sales due to increasing market demand and the promotion of off-season production. South China was the company's weakest region, with an increase of 14.3% in sales revenue, due mainly to new production capacity.

During the reporting period Anhui Conch put seven new cement grinding plants into operation. Its Merek grinding plant in Indonesia has started operation and construction continues at plants Conch North Sulawesi in Indonesia, Battambang Conch Cement in Cambodia and Luangsprabang Conch Cement in Laos. Preliminary work for new plants in Russia, Laos and Myanmar is also in progress.

Vietnam: Long Son opens second production line at cement plant

Long Son has started operating its second production line at its Long Son cement plant in Thanh Hoa province. Following the upgrade the unit has increased its cement production capacity to 5Mt/yr from 2.5Mt/yr, according to the Viet Nam News newspaper. Following the opening of the new line the site has become one of the largest cement plants in the country.

Myanmar: LG International plant starts trials

South Korea's LG International has started test production at its plant in Myanmar. The plant is run as a joint venture operation with local company Blue Diamond, according to the Korea Economic Daily newspaper. LG International spent US$40m to buy a 51% stake in the business in 2015.

China: CNBM and Sinoma enter into merger agreement

China National Building Material (CNBM) and China National Materials Company (Sinoma) have entered into a merger agreement. The exchange ratio has been set at 1 Sinoma share to exchange for 0.85 CNBM share. After the merger is completed Sinoma will be absorbed into CNBM. Merger preparations for the two state-owned companies have been ongoing since mid-2016 when the Assets Supervision and Administration Commission announced the move.

CNBM is the largest cement company in the country with a reported total production capacity of around 409Mt/yr. Sinoma is a cement engineering company and the fourth largest cement producer in China with a total production capacity of approximately 112Mt/yr. The merger is part of the government's plans to consolidate production domestically and refocus its industries internationally as part of the 'One Belt, One Road' initiative.

Philippines: Philippine Cement Importers Association backs pre-shipment inspection

The Philippine Cement Importers Association (PCIA) has offered its support for government plans for the pre-shipment testing of imported cement. It has also backed the Bureau of Philippine Standards' (BPS) new department administrative order that requires mandatory certification of cement products, according to the Philippine Star newspaper. PCIA executive director Dani Enriquez said the draft administrative order was consistent with ISO standards and with the Key Principles and Obligations of the International Agreement on Technical Barriers to Trade administered by the World Trade Organization.

However, chief executives from cement producers, including Eagle Cement, Taiheiyo Cement Philippines, Republic Cement, Cemex Philippines and Mabuhay Filcement, have opposed the proposed change in government import regulations. Some of the producers have favoured testing of imports upon arrival in the country instead.

India: Star secretary resigns

Manoj Agarwal has resigned as the company secretary and compliance officer of Star Cement, with effect from 2 August 2017. His successor is Debabrata Thakurta, a member of the Institute of Company Secretaries of India.

Nepal: New plant agreed

The Investment Board of Nepal (IBN) has signed a project investment agreement worth US$359m with China's Hongshi-Shivam Cement in connection with a cement plant being built at Nawalparasi. The agreement is the first of its kind signed by the IBN with a private sector company and it will last 15 years, according to the Kathmandu Post newspaper. The investment deal is the biggest made by a foreign company in the country's manufacturing sector.

Hongshi-Shivam Cement is a joint venture between Nepal's Shivam Holdings, which also produces the Shivam brand of cement, and Hong Kong Red Lion Cement No 3, a subsidiary of China's Hongshi Group. The Chinese company owns a 70% stake in the joint venture. Commercial production of cement is planned to start at the plant in 2018.

India: Star Cement to invest US$156m on expansion plans

Star Cement plans to invest US$156m towards building a new clinker grinding plant and expanding the clinker production line of its existing plant at Lumshnong in Meghalaya. The cement producer plans to build a new 1.5 – 2Mt/yr grinding plant for US$47m at Siliguri in West Bengal, according to the Hindu newspaper. It also intends to spend US$109m on doubling clinker production to 5Mt/yr at the plant in Siliguri by 2020. The investment will be funded internally and by loans.

India: Sanghi to build floating terminal at Kochi

Gujarat's Sanghi Cements is preparing to build a floating terminal at Kochi Port in Kerala. The plan is intended to target markets in the south of India, according to The Hindu newspaper. The floating terminal will consist of a berthed ship with a bagging plant on-board and it will have a capacity of 0.3Mt/yr.

Australia: Boral revenue flat

Boral Australia's external revenue for its cement business remained flat at US$240m in the company's financial year, which ended on 30 June 2017. The company said that its external revenues were steady, underpinned by a 2% price increase and lower wholesale volumes to support higher volumes of cement sold internally. Total sales volumes of cement rose by 2%. Its cement businesses earnings grew, supported by price and volume gains as well as productivity and material input cost benefits, partially offset by higher energy costs. Overall, the division's total revenue rose by 1% year-on-year to US$2.61bn from US$2.60bn.

Indonesia: KSI launches slag grinding plant

Krakatau Semen Indonesia (KSI), a joint venture between Krakatau Steel and Semen Indonesia, has launched a slag grinding plant in Cilegon, Banten. The 0.69Mt/yr ground granulated blast furnace slag (GGBFS) plant had an investment of US$31m, according to the Jakarta Post newspaper. Construction at the site started in 2014. Both the companies running the venture are state owned and they own an equal share each in the plant.

Fiji: Pacific Cement shuts down for upgrade

Pacific Cement was shut down for three weeks in September 2017 for upgrade work, including the installation of a new cement mill motor, trunnion gear, dust collectors and sensors. It expected at least 15 engineers and technicians from Australia and New Zealand to work on the repairs. Company director Sowani Tuidrola added that the cement producer has imported 25,000t of cement from Vietnam to meet market demand.

Malaysia: CMS profit jumps eightfold

Cahya Mata Sarawak's (CMS) net profit jumped more than eight times to US$15.2m in the second quarter of 2017, from US$1.8m in the same quarter of 2016. The positive result was mainly due to lower handling costs, cheaper imported clinker and lower clinker production costs brought about by stable production and lower coal prices. The net profit for the six-month period was also higher by more than nine times at US$20.5m from US$2.1m in the first half of 2016. Total first half revenue decreased by 10% year-on-year to US$157.1m from US$174.7m.

Pakistan: Pioneer contract for Loesche

Germany's Loesche has been awarded a contract for four vertical roller mills by China's Chengdu Design & Research Institute for Pakistan's Pioneer Cement, which is expanding its production capacity to 8000t/day in the Chenki/Khusab district in Punjab Province. The contract includes a 630t/hr Loesche mill for grinding raw meal, two Loesche finish mills, each with a capacity of 235t/hr, and a 60t/hr Loesche coal mill. Delivery is due by the autumn of 2018.

GLOBAL CEMENT NEWS: *MIDDLE EAST & AFRICA*

Zimbabwe: PPC highlights import risk to Colleen Bawn plant

PPC Zimbabwe has hinted that it may be looking to shut down its Colleen Bawn Cement plant in Gwanda, citing pressure from cheaper imported clinker as well as smuggled cement coming over the border. If it decides to close the plant, the move would represent a significant blow for PPC Zimbabwe and PPC's wider activities outside of its native South Africa.

The management has appealed to the government for protection, stating that, unless measures are put in place to curb cheap imports, the firm risks losing its investment at Colleen Bawn. It estimates that a wider community of around 4000 rely indirectly on the plant for their livelihoods. The plant has been in operation for more than 70 years.

Country managing director Kelibone Masiyane said, "The cost of production is very high in Zimbabwe when compared to the rest of the region. Our competitors are importing clinker at cheaper cost and they are jumping the production process. The biggest challenge here at Colleen Bawn is that we incur huge costs producing clinker and because of this there is a risk of closure of the plant and opting to import clinker instead."

Kenya: ARM situation mirrors national construction picture

ARM Cement's revenue fell by 20% year-on-year to US$52m in the first half of 2017 from US$65m in the same period in 2016. Its loss for the period grew to US$14m from US$2.6m. Cement production dropped by 3.9% to 3.18Mt in the half year of 2017 according to data from the Kenya National Bureau of Statistics reported by the Kenyan Star newspaper. Cement consumption also fell during the first five months of the year, by 2.3% to 2.5Mt.

Nigeria: BUA plant commissioning increases national capacity further

The Nigerian Vice President Yemi Osinbajo commissioned the 3Mt/yr second kiln line at the BUA Obu Cement plant at Okpella, Edo State on 30 August 2017. He had earlier performed the ground-breaking ceremony at the start of the construction phase of the line. Once the line is fully commissioned in early 2018, it will bring the plant's capacity to 6Mt/yr.

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South Africa: PPC seeks higher offer from Fairfax

PPC is seeking a higher offer from Canada's Fairfax Financial Holdings that has made a bid to buy a stake in it. The cement producer said in a document to shareholders that it anticipated that Fairfax would make a higher bid given 'the lower offer price on the table'. The Canadian financial company offered US$154m to buy a portion of PPC with the condition that it also merge with AfriSam. PPC also confirmed that it had received a non-binding communication from Nigeria's Dangote Cement to buy it.

Mozambique: Government announces new cement plant for Niassa

President Filipe Nyusi has announced that work on building a new cement plant in Niassa province will start later in 2017. The unit is expected to source many of its raw materials locally, such as limestone and clay, according to the Mozambique News Agency. Once operational the plant is expected to create over 500 jobs. The project follows the reopening of the Cuamba to Lichinga railway in late 2016.

Israel/Palestine: West Bank case against CRH dismissed by court

A US$34bn lawsuit by Palestinian activists against a group of businesses including CRH has been dismissed by a court in Washington DC. The activists had tried to sue various groups with connections to Israel for allegedly 'profiteering' from the building of Jewish settlements in the West Bank, according to the Irish Independent newspaper. CRH was targeted due to its former co-ownership of Nesher Cement, which produced cement used by the Israeli government in the West Bank. Before it sold its 25% stake in the Israeli cement producer in late 2015 CRH had received protests at its annual general meeting.

South Africa: New Lafarge country CEO

Lafarge South Africa has appointed Rossen Papazov as its country chief executive officer (CEO). Papazov will join the company with effect from 1 October 2017, according to Business Report. He has been the country head for Holcim in Azerbaijan for the last four years. Prior to this he originally joined Holcim in 2000 as its Business Development Manager for Bulgaria.

Ethiopia: Mugher brings in big bucks for Dangote

Dangote Cement's plant at Mugher is the second biggest earning plant in the group's network. It reported revenue in excess of US$85.8m for the Ethiopian fiscal year that ended on 8 July 2017, according to the Agence de Presse Africaine. Sales and marketing deputy manager Tariku Alemayehu said that the majority of the earnings came from exports of over 2Mt of cement to neighbouring countries.

The Mugher cement plant recently built a 120bag/yr bagging unit for over US$21.5m. The cement plant is the largest in the country and it produces 32.5 and 42.5-grade cements.

Tanzania: Manyara seeks investors

Manyara Cement is seeking investors to help it build a 0.6Mt/yr plant in the Hanang District of the Manyara Region. Project Engineer Felix Laizer said the plant would be built in phases, according to the Daily News newspaper. The unit is still in the preparation stage and it has been registered at the Tanzania Investment Centre (TIC). Around US$38m will be spent on the first stage of the project. It is undecided at present whether the site will manufacture its own clinker or import it. The project also plans to build a captive power plant in the long term to power its mill.

UAE: Thermax Group wins contract to build power plant for cement plant in UAE

India's Thermax Group has won a contract worth US$43m to build a captive power plant for a cement company in the UAE. The scope of supply for the unnamed customer includes design, engineering, manufacturing, construction and commissioning of the solid fuel based power plant with two circulating fluidised bed combustion (CFBC) boilers. It will also supply emission control equipment and a water treatment plant for the project, which will be commissioned by mid-2019. The order is Thermax's first in the Gulf Cooperation Council region.

Senegal: SOCOCIM targeting 56% market share

Youga Sow, the director general of SOCOCIM Industries, says that his company is aiming for a market share of above 56% in Senegal. He made the comments at a local event, according to local press. Sow added that the country produced just 3.2Mt of cement in 2016 despite having a production capacity of 8Mt/yr. The other major cement producers include Ciments du Sahel and Dangote Cement.

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Intercem Group

Official inauguration of a train unloading station at the Cimfaso grinding plant in Burkina Faso

Germany's Intercem group has been awarded a contract for three train unloading stations for cement by Cim Metal Group, the first of which has just been inaugurated...

Above right: One of Cim Metal Group's 200 new wagons.

Above: Map showing the rail connections used by the group that connect Abidjan, Bobo-Dioulassa and Ouagadougou.

Right: Inside the train unloading station at Cimfaso.

Below: Part of a tour during the inauguration proceedings.

A further step has been taken in connection with three earlier big orders Intercem has been granted by Cim Metal Group in West Africa, Cimfaso in Ouagadougou, Cim Ivoire in Abidjan and Cimasso in Bobo-Dioulasso. Each of the three cement grinding plants will also have a train loading and unloading station, planned, engineered and supervised by Intercem.

Each of the three plants will have a train unloading station...

The first train unloading station was finished in August 2017 in the Cimfaso plant in Ouagadougou. For the professional mastering of logistical obstacles, the raw material transport was complemented by the procurement of 200 train wagons, the first 50 of which were received in the middle of August 2017 at the Cimfaso plant in Ouagadougou and officially inaugurated by the Minister of Transport of Burkina Faso.

According to the CEO of Cim Metal Group, this project is a revolution in terms of transport of raw materials and will support the development of companies in logistics and environmental protection. It will create 50 new jobs in the unloading hall and along the maintenance system of the train route.

Cim Metal Group, with its policy of development and expansion, has decided to add the 200 new wagons to the existing vehicle fleet of 500 trucks, aiming at the improvement of the provision of clinker to the Cimfaso site in Ouagadougou and the Cimasso site – under construction in Bobo Dioulasso - as well as the transport of limestone from the Burkina sites to Abidjan, Côte d'Ivoire.

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 Sri Lanka, Pakistan, Paraguay, Uruguay, Russia, Nigeria and Brazil.

South Africa: CEM I 42.5 R costs about US$74.87/t, down from US$112.13/t in 2012. A 50kg bag of cement 32.5 N or R costs US$4.49/bag.

Egypt: Ordinary Portland Cement prices as of 21 September 2017: Arabian Cement (Al Mosalah) = US$43.93/t; Arabian Cement (Al Nasr) = US$41.55/t; Cemex (Al Muhandis) = US$46.09/t; Building Materials Industries = US$41.55/t; ASEC Cement = US$41.95-42.80/t; El Nahda Cement = US$41.38/t; Wadi El Nile Cement = US$41.95/t; Lafarge (Al Makhsous) = US$42.23t; Arish Cement = US$41.55/t; Sinai Cement = US$41.38/t; National Cement = US$41.95/t; El Menya Cement = US$42.23/t; Suez Cement = US$42.23/t; Tourah Portland Cement = US$40.81-42.23/t; Helwan Cement = US$42.23/t; Misr Beni Suef Cement = US$26.07/t; El Sewedy Cement = US$43.65/t; South Valley Cement = US$41.95/t; Misr Cement Qena = US$41.55/t.

White cement prices as of 21 September 2017: Sinai White Cement (Alabid Elada) = US$100.91/t; Sinai White Cement (Super Sinai) = US$98.07/t; El Menya Cement - Super Royal = US$97.51/t; Menya Helwan Cement = US$97.50/t.

Blended cement prices as of 21 September 2017: Sinai Cement - Alnakheel = US$37.59/t; National Cement - Altawfir = US$37.58/t; Helwan Cement - Alwaha = US$37.42/t.

Sulphate-resistant cement prices as of 21 September 2017: Cemex Albukawe = US$46.20/t; ASEC Cement (Asic Sea Water) = US$45.23/t; Suez Cement (Alsuez Sea Water) = US$45.92/t; Lafarge (Kaher Albehar) = US$41.04/t; Suez Cement (Al Suez Sea Water) = US$44.67/t; El Sewedy Cement = US$44.78/t.

China: Sunsirs Commodity Data Group reports All-Chinese cement prices: 20 September 2017 = US$48.26/t; 15-19 September 2017 = US$48.00/t.

India: Some established manufacturers in Chandrapur have been reported to have 'formed a cartel,' which local press claims has 'inflated the cost' of cement by over US$0.77/bag (50kg) in 30 days to 11 September 2017. The prices for bulk orders of bagged cement, which were hovering in the range of US$3.05/bag in early August 2017, have since touched US$4.00/bag, including delivery and Goods and Services Tax.

Market observers told The Hitavada newspaper that players like Ambuja, Ultratech, ACC and Birla had colluded to push the prices even when demand for the cement has not gone up. Meanwhile brands like JK Laxmi and Emami sold cement at a cost of US$3.24/bag (bulk orders), while Birla's cement was available at U$3.08/bag (bulk orders) on 7 September 2017.

"The upswing in the prices is not driven by increased demand but it is only because of the established players," said one market observer, on condition of anonymity. "It is important to note that companies based in and around Chandrapur are the only manufacturers that have inflated the prices, clearly indicating that they are doing it together to bring in 'excitement' to the sector." The observers highlighted that prices of cement manufactured by companies located in Chhattisgarh are still trailing behind those of Chandrapur.

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.

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Where do you stand on the quality of your life versus your standard of living?

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

It's recently been discovered that spending more time outdoors could boost your happiness as much as quadrupling your disposable income.[1] The same study also suggests that having quality sleep and being satisfied with one's love life are the two most important contributors to 'living well,' while job security, the good health of close relatives, chatting to neighbours and having a strong local support network are also factors. Even sitting down to eat socially with family and friends can have a strong influence on your happiness.

Does this matter? Well, a few years ago, a survey of employees of one major cement producer found that they were happy with practically every aspect of their employment, apart from their overall work-life balance. Workplace ambiance, travel opportunities, safety, pay, promotion prospects - all fine. It was apparently the number of hours that they were being asked to work each week, contrasting with the number of hours that they had to themselves (for eating socially with friends, for example), that they objected to. What to do?

I know of a company that, when it was in a financial corner during the Great Recession of 2007/8 to 2017/8 (central banks are now unravelling their QE programmes in a new trend, of Quantitative Tightening, or QT), that asked its employees to take a 10% pay cut. They replied that they would, so long as they could also take a 10% cut in time as well. This was the equivalent of half a day a week, or an extra day off per fortnight. The employees were annoyed that they had to take a pay cut, but fairly happy to enjoy a longer weekend every two weeks (and even more satisfied that their job security was stronger through a period of economic uncertainty). When the worst of the crisis was over, the cut in pay was reversed - but the employees had become used to the extra time off. Like coming back to work on the first day after the holidays, it was tough for them to go back to full time work again. It seems that we might all be happier to cut our working hours a little - even if it meant earning a little less (although our spouses might have something to say about this, it's true). This goes right to the heart of the contradiction between our standard of living and our quality of life.

Our standard of living is defined as the degree of wealth or material comfort that is available to a person or group. We might surround ourselves with the 'finer things in life' such as expensive wines, fancy cars and a big house, and we would have a high standard of living (although it's all relative - there's no absolute benchmark for a high standard of living and it might contrast between, say, Qatar (average GDP per person US$105,091/yr) and the Democratic Republic of Congo (average GDP per person US$394/yr).[2]

On the other hand, our quality of life has been summarised as 'general well-being... including everything from physical health, family, education, employment, wealth, religious beliefs, finance and the environment.'[3] I would argue that quality of life also includes intangibles such as your own mental health, your happiness with your own circumstances, your opportunities for leisure and your work-life balance. Even if you work hard - harder than you want to, perhaps - then if you have opportunities for leisure and for regaining balance in your life, then you might still be happy with your quality of life.

For example, I'm anticipating a very busy first half of 2018, but I also have something else to look forward to: I'm organising and participating in the first-ever Irish Sailing and Mountaineering Adventure Challenge (ISAMAC), a sailing and mountain-running race starting in Kinsale, Ireland on 16 June 2018 (search 'ISAMAC race' for details). Looking forward to this is going to get me through the cold and dark days of winter, I hope.

At the risk of repeating myself, I'm always startled by the simple methods that we can all take - at low or no cost - to improve our quality of life. Getting a good night's sleep (for example by not drinking too much tea or coffee - or alcohol), spending less time on screens and social media, spending more time in the outdoors, talking to a friend, sharing a meal, helping someone or volunteering to help others and taking some exercise - they've all been shown to powerfully increase our life satisfaction, and they cost nothing.

At the recent Loesche Symposium in Düsseldorf, we had a fantastic 'Barcamp' discussion about how to encourage more women to work in the cement industry (where the proportion is probably something like 100 men to each woman). We agreed that apart from sheer strength, women could do everything as well as a man, and some things maybe even better. However, the industry needs to be welcoming and encouraging - to all employees - and providing good workplaces and a good work-life balance would be a fantastic first step.

1 http://natcen.ac.uk/our-research/research/sainsbury's-living-well-index/

2 https://www.weforum.org/agenda/2015/07/which-are-the-poorest-countries-in-the-world/

3 https://en.wikipedia.org/wiki/Quality_of_life

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Photos courtesy Stephen Elliott, Hope Cement

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