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APRIL 2016



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Dear readers,

Welcome to the April 2016 issue of *Global Cement Magazine* - the world's most widely read cement magazine! As well as the latest global cement industry news, products and trends, this issue contains a wealth of technical articles and features.

To coincide with our review of the recent *10th Global CemFuels Conference & Exhibition*, on alternative fuels for the cement industry, which took place in Prague, Czech Republic in February 2016 (Reviewed on Page 7), we have two detailed technical case-studies concerning the use of alternative fuels. These come from Hope Construction Materials in the UK (Page 19) and from Aslan Çimento in Turkey (Page 14), which also discusses a new waste heat recovery system.

Due to the high number of cement-relevant events taking place in Germany that coincide with our April issue, we have focused once again in this issue on the German cement sector, one of the most advanced in the world. To fit in with the topics of bauma, POWTECH and the Hanover Fair, we also have articles on bagging trends (Page 32) and conveying (Pages 22 and 30).

Our plant review in this issue turns to deepest Siberia, as we speak to senior figures at BaselCement's Achinsky Cement plant (Page 50). Despite terrible conditions for construction in Russia at the moment, this 50 year old wet process plant was able to expand its market share in 2015 relative to 2014 by refocusing on its core Siberian market. It is helped by an unusual production process that uses waste nepheline (belite) sludge from the neighbouring Achinsky Alumina Plant as a raw material. While this solution isn't for everyone, using this alternative raw material helps the plant to save on input processing costs and saves on fuel requirements. This is vital for a wet process plant, even in fuel-rich Russia.

Our news sections cover cement industry developments from around the world, effectively taking the pulse of the sector each month. Reading between the lines, the global economy - and the cement sector - is just treading water at the moment.

We are currently planning our forthcoming issues and we're looking to feature exciting and innovative cement plants around the world. If you would like to spotlight your new cement plant - or upgrade project - then please contact me at rob@propubs.com.

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

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bauma 2016

11-17 April 2016, Munich, Germany
www.bauma.de

POWTECH 2016

19-21 April 2016, Nuremberg, Germany
www.powtech.de

Hanover Fair 2016

25-29 April 2016, Hannover, Germany
www.hannovermesse.de

3rd Global EnviroCem Conference & Exhibition

10-11 May 2016, London, UK
www.Environmental-Technology.com

IEEE-IAS/PCA Cement Conference

15-19 May 2016, Dallas, Texas
www.cementconference.org

11th Global Slag Conference & Exhibition

24-25 May 2016, London, UK
www.GlobalSlag.com

Hillhead 2016

28-30 June 2016, Buxton, UK
www.hillhead.com

BULKEX 2016

5-6 October 2016, Harrogate, UK
www.mhea.co.uk/bulkex-2016/

21st Arab-International Cement Conference and Exhibition

16-18 November 2016, Abu Dhabi, UAE
www.aucbm.com

11th Global CemFuels Conference & Exhibition

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Robert McCaffrey, Editorial Director

10th Global CemFuels Conference - Reviewed

The 10th Global CemFuels conference and exhibition on alternative fuels for the cement and Lime industry has successfully taken place in Prague, with 170 delegates, 35 exhibitors and two cement plant field trips. The 11th CemFuels Conference and Exhibition will take place in Barcelona early in 2017.

The 10th Global CemFuels conference featured a major exhibition of international suppliers of alternative fuels (AF) equipment and services, which was busy throughout the event.

The keynote presenter at the conference was **Sussan Pasuki** of HeidelbergCement, who spoke about her company's reasons for trying to use more alternative fuels and raw materials. She stated that the aim was to create a more 'liveable' environment. The Paris Cop21 agreements were followed by the WBCSD's CSI members pledging to reduce their CO₂ emissions by 20-25% by 2030. Indeed, there have been various calls to phase out the global use of fossil fuels by 2050. HeidelbergCement has been developing new low energy clinkers, new production methods without using fossil fuels, and is active in CCS (carbon capture and storage) projects. Production optimisation is ongoing, in order to reduce the energy consumption for clinkerisation. Waste markets are continually changing, seemingly always becoming more difficult to deal with, but the outcome of these changes is to require increased flexibility and a wide fuel portfolio. The cement industry needs a high quality fuel, with high heat value, low moisture, low ash and good burnability, but the market mitigates against all of these, requiring a final balance between quality and



1: Sixty delegates joined the pre-conference plant trip - kindly-hosted by Lafarge's Čížkovice facility.



2: FLSmidth's (l to r) Thomas Jennewein, Peter Erbel and Marc Kalan enjoying the welcome networking evening.



3: Cross Wrap's Heikki Jyrkinen, left, greets Ulla Billing and Hannes Tschirpke from Presona AB.



4: Sussan Pasuki of HeidelbergCement presents her keynote paper focusing on increasing alternative fuel and raw material usage.

cost. In HeidelbergCement's Central Europe-Central Asia area, 75% of alternative fuels use is RDF, with a further 17% from tyres/rubber. Sussan said that diversification is essential and that the company should increasingly look at the use of hazardous waste as AF. Sussan also suggested that further advances in AF use can be gained through improvements in AF drying, through improvements in burnability through cutting and/or milling the materials, through increasing residence times, through oxygen injection and through new burner types. HeidelbergCement's merger with Italcementi will undoubtedly bring changes (and new targets). The company will also make great efforts to improve AF usage rates in developing countries, and in the US and Canada, where AF thermal substitution rates (TSR) lag behind the rest of the developed world.

Second up at the conference was **Neville Roberts**, on behalf of N+P, speaking about the development of a new waste-derived pelletised AF called SubCoal. The material has moisture content of lower than around 6%, relatively high density (450kg/t) and high calorific value (CV) of around 20MJ/kg. SubCoal is millable with coal, meaning that no significant investment is required. The material is hydrophobic and can be stored outside prior to

combustion. Full scale trials of milling and usage are ongoing.



5: Luc Reibel, left and Luc Rieffel of Walter Materials handling, ATS Group pose for the camera.



6: Untha's Peter Streinik, right, in discussion with Herb Case, Evolution Environmental Group LLC ('E2')



7: Convaero's Andreas Mauser (far right) and Marcus von Reden (centre) welcome Jan Theulen, HeidelbergCement, Jori Kaaresmaa and Ville Hakanperä from BMH Technology.

8: Moises Rodriguez Nuñez of Cemengal in discussion with Majed Al Ossailan, left, and Saleh Alshabnan of City Cement, Saudi Arabia.

9: The Outstanding AF Project of the Year award was won by Cemex/SUEZ for the Malpass Farm facility in the UK. Torsten Zoth, Cemex, left and Andy Hill, SUEZ, right, received the award from Robert McCaffrey, CemFuels conference convenor.

10: The AF-using Company of the Year was awarded to LafargeHolcim for the first time; centre, Christopher Ehrenberg and Christian Lampl, right.

Andy Hill of SUEZ next gave an overview of AF markets in Europe. His company recovers around 60% of the waste it collects in the UK, and it also operates in a number of other countries around the world. Andy first said that it is next to impossible to forecast the future oil price: the level of overcapacity is only around 2%, but prices have dropped 75% from their peak. Petcoke pricing has also dropped, by around 50% in the last 12 months. Andy pointed out that the daily rental rate of a Ferrari F40 is around US\$5600, which is cheaper than renting a Capesize bulk transporter, at around US\$1600/day. This is bad news for shipowners, but good news for AF producers that want to open up new markets. Andy said that the EU now aims to create a circular economy, minimising the use of virgin materials and maximising the use of waste and by-products from other industries. European legislation is now being augmented to make the circular economy even tighter, using mandatory separate collection for municipal wastes and further reducing waste going to landfill. The putative target for recycling in Europe will be 75% of all materials, with higher levels for metals and plastics. Carbon prices are also likely to be driven up through legislative action, partly through restricting the number of permits issued. Standards legislation will also be brought into being for alternative fuels, improving traceability, driving out of business some less scrupulous operators. Andy pointed out that the cement industry is now in competition with many other industries for AF, including lime, energy, steel, chemicals and glass industries. Andy concluded that the AF market worldwide could amount to over 40Mt/year.

Ed Verhamme of Alternate Resource Partners spoke about how to identify the right waste markets for AF ('and R'). Ed suggested that the CO₂ per tonne of clinker produced will be one of the key performance indicators in the future, lower fossil-

fuel-intensive fuel mixes will be used, there will be a lower clinker factor and CCS will become a reality. Ed presented data showing not only the mix of means of waste disposal in different continents, but also the variation in waste mix between developed (mainly paper and plastics) and developing (higher levels of organics) countries. Ed suggested that the outlook has changed from a 'waste' mindset to one of 'How can we handle our discarded resources in ways which do not deprive future generations of some, if not all, of their the value?' Ed spoke about a factory in the Netherlands which is taking waste water treatment sludge, which might currently be used as a fuel in the cement industry, but which is being broken down into its component parts of paper fibres and of organic waste, with each of these separated commodities being used as raw materials in paper-making and as fertiliser: in the waste hierarchy, these uses would outrank the use of dried sludge as fuels in the cement industry in the traditional waste hierarchy.

A pair of speakers, **Pier Cella Mazzariol** from Entsorga and **Gianni Gallozzi** of Italcementi, next spoke about Entsorga's 100,000t/year MBT facility in West Virginia, just 120km from Washington DC. The biological drying plant will produce around 50,000t of 'Prometheus' solid recovered fuel (SRF) with Cl at less than 0.3% and this will be delivered to the nearby Essroc cement plant to be co-fired with coal. The US\$25m unit will come on-stream at the end of 2017. Mr Mazzariol pointed out that the facility can only come into being with the strong support of a variety of local bodies, including the waste provider, funders and lenders, the Environmental Protection Agency and the cement plant, working together, finding solutions together. The EPA in particular pragmatically awarded the input into the facility's material stream the status of 'non-waste,' making its creation significantly easier. "It is essential to have a 'take or pay' contract from the cement plant," he said,



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GLOBAL CEMFUELS: CONFERENCE REVIEW

11: The Most Innovative Technology of the Year award was won by Lindner-Recyclingtech; left to right, Marco Egger, Gerd Tischner, Fritz Driessler.

12: AF-Supplier of the Year award was won by N+P of the Netherlands. Karel Jennissen is seen here receiving the award.

13: Global CemFuels Personality of the Year was awarded to Jan Theulen, HeidelbergCement.

14: After-dinner speaker Con Manias, of FCT Combustion, presenting a genuine FCT Olympic torch to draw winner Thomas Jensen of ReTec Miljø, Denmark.

“in order to make the project bankable.” In the end, all participants involved in the project can report a ‘Win’ outcome from the new plant - and this is a project that has been created on a ‘pure market’ basis, without subsidies. The project - which started after a conversation at a previous Global CemFuels Conference - will have taken around four years from start to finish, but could be replicated in a much shorter time in the future.

Markus Binding of Convaero presented the results of three years of operation of a bio-drying MBT facility in Kula, near Istanbul, Turkey, operated by Cementir Holding and Recydia. The project was built in stages, culminating in the creation of 35 covered bays, each holding 600t of MSW. The essence of Convaero’s technology comprises a covering membrane which prompts temperature rises while reducing odours, and active aeration. The organic content of the received waste is around 50%, with mixed paper

the next largest fraction, followed by plastic films, textiles and rigid plastics. Moisture content of the received waste is high, at perhaps 55%. At all stages of treatment, saleable fractions are separated for sale. Markus stated that material can be produced in as few as 15 days in the hot summer months, but will take as long as 25 days in the cold winter months, meaning that the throughput of the plant is reduced in the winter. Output from the plant is at a moisture content of less than 20%, with CV of 2850kCal/kg and Cl content of around 0.75%. Ash content is around 25%, density in a walking floor truck is 750kg, but baled waste has a density of more than 1t/m³. Lessons to be learned from the project would include the importance of having a well-trained team ready for the commissioning of the plant, the importance of maintenance, process control and continuous improvement. Markus baldly stated that if there is no gate fee, “there is no business.” At the other end of



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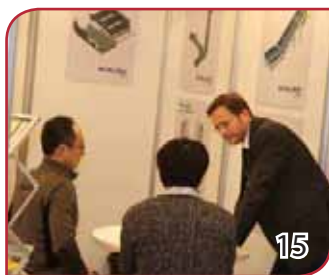
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17

15: Michael Gramling, WTW&MHC Group, right, in discussion with delegates from Siam Cement (Thung Song and Kaeng Khoi plants).

16: Christina Kastner and Hannes Uttinger of Austrian specialist A TEC Production & Services pose for the camera at their exhibition stand.

17: Richard Tromp of BHS Equipment presenting his company's RDF production expertise.

the factory, SRF is a real product, he said, which must command a real price, based on Euros/GJ.

Christophe Garcia of shredding machine manufacturer Precimeca next gave some ideas on how to select the best tyre shredder for the production of RDF, in association with Vicat Turkey. Christophe first of all stated that "Tyre-derived fuel (TDF) is first-class alternative fuel." TDF has a high CV, stable and homogeneous properties, low sulphur content and a high biomass fraction (20% for passenger car tyres, 30% for truck tyres). TDF may in turn have an average mix of 70% passenger car tyres and 30% truck tyres. He suggested that a shredder should be designed to create a clean cut, so that the metal bead of the tyre is not left outside the shredded particles, since this can lead to problems in handling, wear and blockages. The company's NEO tyre shredder can provide such a clean cut. Blades take around a day

to change, while the blade lifetime is around 2500 hours.

Jori Kaaremaa from BMH Technology and Ms. Ursula Kääntee of Finnsementti next co-authored a paper on how to match quality and price, in this instance producing AF for a 40-year old kiln. Finnsementti has managed to reduce its specific CO₂ emissions by 27% since 1990, largely through the use of AF. The Parainen cement kiln has a 2200t/day cyclone preheater kiln with riser firing, and this kiln uses waste oils, MBM, TDF and SRF. Jori pointed out that the SRF price must be cheaper than coal and allow both parties to make a profit, while a long-term delivery contract must also exist. SRF quality is specified in the contract, and there should be appropriate 'carrots and sticks,' in order to ensure quality compliance. BMH Technology's Tyrannosaurus shredder has a MIPS, or massive impact protection system,

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18: Luigi Di Matteo of Di Matteo Group receives his award for third best presentation.



19: Sandro Conceição, AVE - Environmental Management and Energy Recovery, Cimpor Inter cement Group and Inês Costa, 3DRIVERS receive their award for second best presentation, 'Co-processing in Portuguese cement kilns: contributions for recycling targets.'



20: Enotec GmbH, represented by Jürgen Kaizik, centre, and Juan Carlos Quintero Fernández, receive the award for the best exhibition stand.

21: Ted T. Reese, right, of Cadence Environmental Energy smiling for the camera after receiving the award for his closing keynote presentation 'Maximising AF use, optimising combustion: Two companies, one goal'. Ted is accompanied by Petar Petrov, left, and centre, Milan Stanoev, Zlatna Panega Cement, Titan Bulgaria.

22: Laura Quarteroni of MOLINARI receives guests from Titan Zlatna Panega, Bulgaria and GAEA Green Alternative Energy Assets, also of Bulgaria.

23: Cemex's Prachovice plant kindly hosted the very popular post-conference plant visit

which avoids shaft and blade damage from foreign bodies in the waste, (which may occur even in pre-sorted waste) such as chunks of steel, bicycle frames (or even dead dogs). A special system ('Zero Gap') ensures that the gap between blades and cutting frame is practically zero, which improves cutting quality. The SRF production system at Finnsementti is sized to be able to produce around 25t/hour, at a size of <80mm. Having a single SRF supplier, rather than a range of suppliers, can be a distinct advantage, potentially for both sides.

Robert Jansky of Cemmac, a cement plant in Slovakia, introduced the next presentation: His company's five-stage precalciner plant has used AF since 2004, in the form of whole tyres, and later RDF, at a rate of 10-20%, peaking at 50%. 60% of the fuel is fed to the kiln and 40% to the calciners, although RDF firing into the calciners is limited to 1t/hour or 20%, due to high CO levels measured at the exit of the stage 4 cyclone (with stage 5 being the bottom stage). However, even with the firing of pure coal, the firing rate is limited by CO levels, which in turn limits the degree of calcination and overall plant capacity. There are also severe problems with sulphur-based build-ups forming in the area above the kiln inlet chamber: in order to remove the build-up, the kiln is stopped for several hours roughly every two weeks. The kiln also suffers from a reducing zone, since unburned AF particles can fall onto the clinker bed. The second part of the presentation was given by **Con Manias** of FCT, who explained how some of these problems were solved. Con pointed out that the base problem was a high variability of sulphur volatility. He showed that the unburned AF landing on the clinker bed led to reducing conditions which led to volatilisation of sulphur and subsequent problems. This can happen with low momentum burners, but this particular plant had a burner of adequate size. Another problem was that there was a relatively high chlorine level in the meal, which was not being fully addressed by an under-sized chlorine bypass. The plant had been adding gypsum into the raw meal, and it was suggested that this should be stopped. Con reminded

delegates that particle combustion happens in three stages: drying, torrefaction and final burn-out of char particles. The burn-out time of many of the RDF particles was longer than the residence time in the calciner. By relocating burners in the calciner, it was possible to start char burn-out much earlier, leading to more complete particle combustion. It was suggested that feeding a finer AF would allow 100% burn-out of particles. It was also suggested that the shape of the main burner flame should be modified to avoid particle impingement on the clinker bed.

Gala Dinner and Global CemFuels Awards

After the first day of the conference, delegates travelled to the elegant Lobkowicz Palace in the grounds of Prague Castle for a sumptuous banquet of Czech cuisine. During the meal, the 2016 Global CemFuels Awards were presented, after a global online nomination and voting process. Outstanding AF project of the year was awarded to Cemex/SUEZ for the Malpass Farm unit in the UK; AF project manager of the year went to Frederico Contente of Masias, Spain; The AF-using company of the year was LafargeHolcim (for the first time); AF-supplier of the year was N+P of the Netherlands; The most innovative technology of the year for AF was Lindner-Recyclingtech's shredders and the Global CemFuels 'personality of the year' was Jan Theulen of HeidelbergCement. Many delegates finished off the evening with a convivial visit to the U Vejvodu hostelry in Old Prague....

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Neslihan Akgün and Özlem Başaran, Aslan Çimento

Alternative fuels and waste heat recovery at Aslan Çimento in Kocaeli, Turkey

Aslan Çimento has been part of OYAK Group since 2009. OYAK Group, one of Turkey's major cement producers, has over 17.5Mt/yr of cement production capacity across six geographically well-positioned cement plants. The Aslan Çimento plant in Kocaeli has 1.25Mt/yr of clinker and 2Mt/yr of cement production capacity. Here, Neslihan Akgün and Özlem Başaran, Environment, Health and Safety Manager and Production Engineer, respectively, from Aslan Çimento describe the results of recent environmental upgrades, including the new solid-recovered fuel (SRF) unit and the waste heat recovery (WHR) system.

Introduction

Aslan Çimento is recognised as the corner stone of the Turkish cement manufacturing industry. The company was established in 1910 as the first private equity of the Ottoman Empire and started operations in 1911 with 20,000t/yr of cement production capacity. It is Turkey's first and oldest cement plant. The plant, together with its quarry and production and harbour facilities, is located by the sea, some 30km from Istanbul. The production base and capacity has been upgraded and expanded as cement manufacturing processes and technology has evolved in the years since the plant's inception.

Newly-introduced environmental laws, regulations and rules have imposed notable restrictions on cement producers in Turkey, which have prompted equipment and process adaptations and modernisations by the entire industry, particularly with regards to emissions controls and waste management. While those restrictions have created an unusually difficult manufacturing environment in all of the heavy

industries, particularly during the transition period, waste management issues have highlighted the topic of alternative fuel use in the cement industry. Additionally, fossil fuel based energy has continued to become increasingly expensive at the same time.

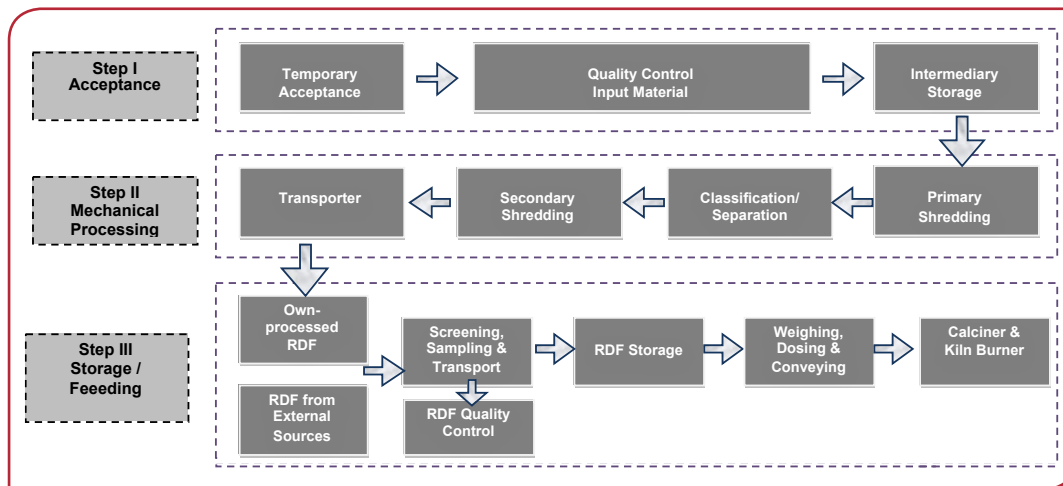
Aslan Çimento saw the change in regulations as an important opportunity and recognised alternative fuels as a sustainable lever for cost management. In addition, to further manage its costs, day-to-day process optimisations became a much higher priority. As such, a waste heat recovery (WHR) project to reuse heat from the rotary kiln was invested in. The heat energy of the excess kiln gas, which had previously been emitted to the atmosphere, is now used to produce electricity by a turbine generator.

Alternative fuel use at Aslan Çimento

Fossil fuels such as coal, petcoke and natural gas provide most of the energy needs of the cement world today. Coal and natural gas are used in their natural forms, but petcoke and other fossil fuels such as

Right - Figure 1: The Aslan Çimento plant in Kocaeli, 30km from Istanbul, has 1.25Mt/yr of clinker and 2Mt/yr of cement production capacity.





Left - Figure 2: The SRF preparation process at Aslan Çimento.

shale and bituminous sands require distillation and refinement to provide usable fuels. These fuels exist as solids, liquids and gases. The finite nature of global fossil fuel resources, high prices and their damaging effect on the environment underscores the need to develop alternative fuels for many industrial systems that rely on fossil fuels. Increased use of renewable and alternative fuels can extend fossil fuel supplies and help resolve air pollution problems associated with the use of conventional fuels.

Coal is the primary fuel burned in cement kilns throughout the world. However, the use of alternative fuels in cement kilns is common and increasing. The range of alternative fuels is extremely wide. They are usually available as gases, liquids and solids. In order to consume alternative fuels, there are three main steps to fulfil (Figure 2):

- The acceptance of alternative fuels;
- The mechanical processing of waste;
- The storage and feeding to burners from silos.

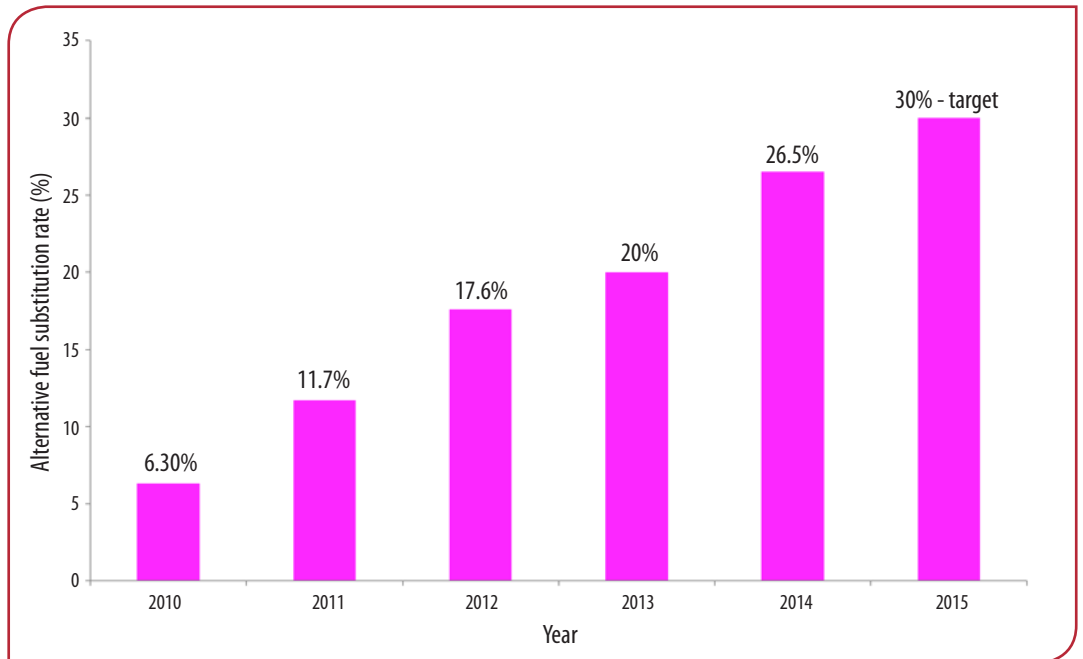
Aslan Çimento only uses solid wastes such as tyres, paper wastes, oil/solvent contaminated textiles, dried sludge, refused-derived fuel (RDF) and plastic residues. The use of these low-grade alternative fuels in precalciners is a viable option because combustion in a precalciner vessel takes place at a lower temperature. In precalciners where kiln exhaust gases pass through, the NO_x emissions are reduced due to re-burn reactions. There is an increased net reduction in CO₂ emissions when the waste is combusted in cement kiln systems as opposed to dedicated incinerators, resulting in a reduction in CO₂ penalties. Since alternative fuels are often cheaper than conventional fossil fuels, the possibility of a competitive edge is also generated.

Besides the reduction in consumption of natural resources and the positive effect on the environment regarding waste disposal, other benefits of using alternative fuels include providing employment and helping to consume the waste of approximately 300 companies from other industries near the Aslan Çimento plant.





Right - Figure 3: The SRF separation and shredding process.



Right - Figure 4: The alternative fuels substitution rate at Aslan Çimento in 2010-2015. The 2015 value shown was a company target.

In 2011, a solid recovered fuel (SRF) unit was established at the Aslan Çimento plant in order to improve its environmental impact, increase its sustainability and reduce its production costs (Figure 3). The SRF unit has 10t/hr of shredding capacity. Outsourced SRF, pre-shredded and ready for consumption, is also supplied.

Since its installation, the benefits of the SRF unit have increased every year and fossil fuel consumption has fallen accordingly (Figure 4). The plant's target for 2015 was 30%. According to the Turkish Cement Manufacturers' Association Benchmark Report in 2014, the plant has the highest alternative fuel substitution rate in Turkey. The average substitution rate of the 50 cement plants in the country is 3.7%. After awareness about Aslan Çimento's use of

alternative fuels spread, more cement plants have turned to alternative fuels to minimise costs and meet environmental targets.

Waste heat recovery (WHR) from the rotary kiln excess gas

OYAK Group has installed waste heat recovery (WHR) units at two of its cement plants; Aslan Çimento and Bolu Çimento. Its four other cement plants do not have WHR systems as the process conditions required for electricity production are absent.

In the rotary kiln system at Aslan Çimento, approximately 270,000Nm³/hr of air comes from the cooler fans that cool the clinker to 80-100°C. In addition, the CO₂ gas that separates from the raw meal produced during the calcination reaction adds

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Right - Table 1: The parameters of the WHR system installed at Aslan Çimento.

Installed capacity (MW)	7
Annual operation duration (hr)	7612
Annual gross power generation (kWh)	52,063,982
Estimated annual net power supply (kWh)	46,138,279

Right - Table 2: Electricity production by Aslan Çimento's WHR system in 2015.

	Average production (kWh)	Total production (kWh)
January	7291	4,463,802
February	7591	4,069,548
March	6993	4,246,452
April	7554	5,262,327
May	7307	5,142,501
June	7653	1,332,450
July	5222	1,558,542
August	6796	4,455,864
September	6740	4,726,116
Total	7016	35,257,332

to this air. All of the gas is used in the mills for drying and transporting the raw meal to the silos from the mills. At the end of the process, the excess gas, around 260,000Nm³/hr, is emitted to the atmosphere after being cooled by the cooling tower.

To recover this loss, Aslan Çimento invested in a waste heat recovery (WHR) unit, which started operations in the last quarter of 2014. The installed electricity production capacity is 7500kWh when 260,000Nm³/hr of excess hot air at 380°C is supplied from the rotary kiln (Table 1). The 7500kWh is equal

to around 26-27% of the plant's energy consumption. Aslan Çimento's electricity production in the first 10 months of 2015 is shown in Table 2.

The waste heat carried by the stack gas is turned into electricity within the steam power cycle system (Figure 5). An ACQ boiler and a pre-heater (PH) boiler were installed at the existing facility system. The boilers heat the gas to the required temperatures and turn the water into steam via heat exchange. The steam runs the condensing impulse turbine by the low pressure-low temperature flow principle. While the mechanical work turns into electrical energy, the 'dead steam' is turned into water via the condenser and sent to the steam boilers to restart the cycle.

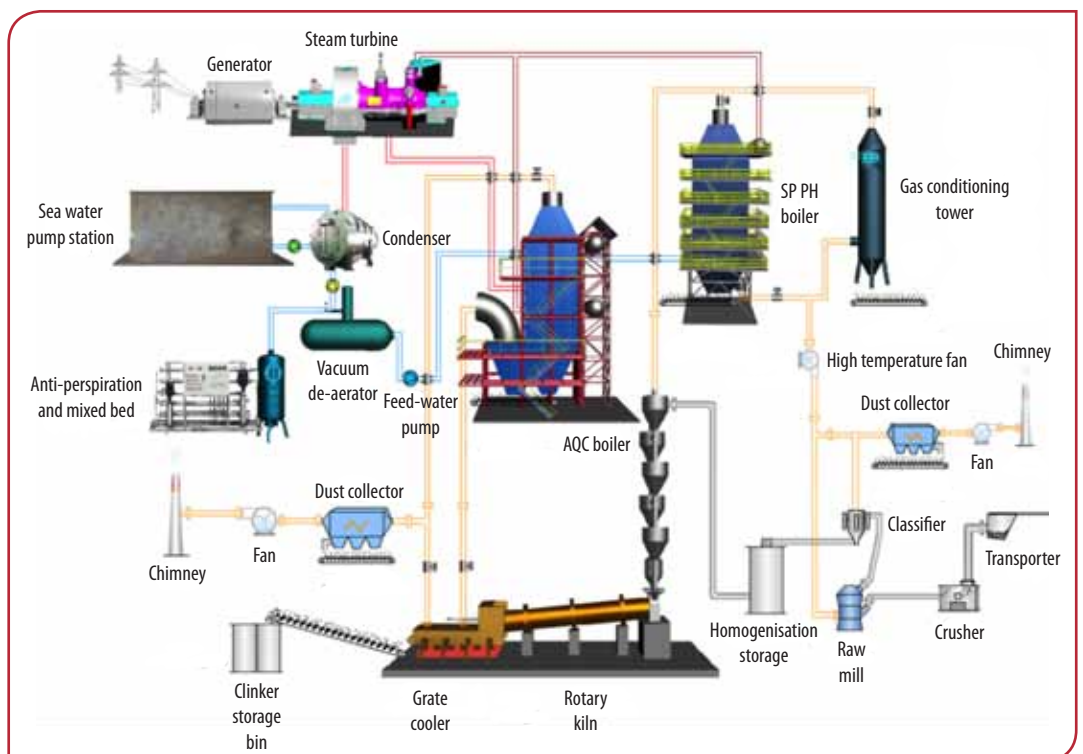
The WHR unit is expected to reduce 3% of total CO₂ emissions from the calcination process and the combustion reactions from cement production at Aslan Çimento. Electricity production via the WHR unit is one of the most important methods for reducing the plant's energy consumption from traditional fuels.

Summary

The importance of using energy resources efficiently is emphasised by OYAK Group Managers at every opportunity, such as in meetings and seminars. Studies to minimise the impact on the environment and decrease the consumption of resources through continuous improvement activities are ongoing at all of OYAK Group's cement plants. Every employee is aware of the importance of sustainability in the cement industry.



Right - Figure 5: A flow chart of the WHR system at Aslan Çimento's plant.



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Matt Drew, Saxlund International

Overcoming the challenges of waste-derived fuels at Hope Construction Materials

Cement production is one of the world's most fuel-intensive industries. Fossil fuels, mostly coal, have tended to be the industry's main power source, although increasingly, cement manufacturers are replacing up to 80% of their fossil fuels with more sustainable waste-derived fuels (WDF). Using WDF reduces production costs and improves energy efficiency. Here Matt Drew, Managing Director of Saxlund International, discusses the challenges faced by Hope Construction Materials in the UK and how these were overcome.

Fuels continue to be a major part of the global cement industry's cost base. In a competitive market, where profit margins are narrow and legacy systems costly to replace, the capital investment required for sustainable production has led to the cement industry, certainly in the UK and Europe, taking an incremental approach to fuel replacement. These incremental changes typically achieve a 10-20% reduction in the amount of fossil fuel used each time a change is introduced.

Fossil fuel substitutes

In the past decade or so alternative fuel systems were being designed to handle tyre chips, meat and bone-meal (MBM) and pellets from sewage sludge. Many plants still operate these. One of the UK's largest cement manufacturers, Hope Construction Materials, introduced tyre chips in 2001, followed by MBM in 2006 and a processed sewage pellet (PSP) feed system in 2012. Hope Construction's plant in Hope, Derbyshire, achieved a fossil fuel substitution rate of around 35%.

In common with other cement manufacturers around the world, Hope Construction Materials wanted to reduce its fossil fuel intake to cut costs, become greener and to operate in a more sustainable way. The company had progressive plans to increase its fossil fuel substitution rate to over 50%. In 2013, it contacted Saxlund about the introduction of a new, future-proof fuel management system to handle solid waste fuel (SWF) more efficiently. With the objective of replacing over 50% of its fossil fuel consumption with alternative, more sustainable fuels such as SWF to power its kilns, Hope Construction Materials had some real challenges to overcome.

SWF is difficult to handle, is sticky, abrasive and not free-flowing. It can bridge and build up easily, blocking feeder systems and halting production, causing costly down-time. If left to build up or held too long in storage, SWF can become compacted due to the amount of residual moisture it contains. It can sweat and even self-combust.

The greatest challenge for cement manufacturers in using SWF is in finding an efficient, future-proof system capable of handling different types of waste-derived fuel. Hope wanted a complete end-to-end solution including reception, storage, transportation, weighing and pneumatic injection of the SWF to its two rotating kilns. On-site storage was required for a minimum of 350m³ of fuel to maintain several hours of fuel storage for uninterrupted operation and fast turn-around for trucks on site.

The solution

Following close consultation, a turn-key solution was designed and delivered using a range of bulk-handling features. Foremost of these was a 350m³ silo, combined with leading-edge push floor technology. This technology, which was patented by Saxlund in the 1970s and has been implemented in hundreds of forms and in different onerous environments over the years, is key to managing the SWF.

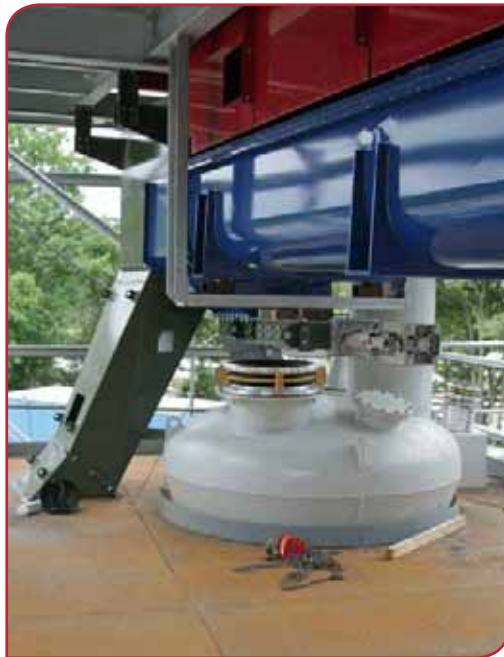
The Saxlund push-floor solution incorporates a series of hydraulically-operated parallel ladders, fitted as a layer into the silo floor. The motion of the ladders pushes the fuel towards the discharge end of the bunker, achieving a mass flow with 'first in, first out' fuel delivery. New waste is added to the top of the silo, while the push-floor extracts it from the bottom,

Below: Overview of the reception, screening and weighing system.





Right: Distribution screws between the two weighing systems



effectively designing out compaction and self-combustion issues.

The shearing action of ladders helps to break up the SWF. The depth is monitored by sensors above each ladder to ensure an optimal feed rate. This minimises the risk of compaction against the back wall of the bunker, which could block the system. It also prevents an over feed of fuel to subsequent equipment.

The SWF silo and push-floor system feed material to a chain conveyor and in turn into a process tower. Metals and other ferrous materials are removed using a drum magnet to protect down-stream equipment and recover metal for collection and recycling. The SWF is then fed to a star-screening system, which breaks down oversized clumps. At the push of a button the particle size can be varied from between 10mm to 50mm to optimise the fuel supply. This future-proofs Hope Construction's solution in terms of dealing with changes in fuel composition. Oversized material that is not broken down is passed over the stars and rejected into a skip. Right-sized fuel falls into the twin screw feeders and into respective FLSmidth Pfister weighing systems.

The Pfister systems comprise fully electronic weighing, controlling flow rates with a high degree of accuracy. As waste from each screw is passed into the pre-hoppers on top of each rotor-weigh feeder, the volume is controlled to ensure a constant filling level. From here the material is passed into the rotor-weigh feeder, facilitated by an agitator in the pre-hopper.


Control systems continuously measure the bulk material inside the rotor wheel, together with its angular velocity at the discharge point, ensuring that the mass flow of the fuel remains constant. The bulk material is then fed into the pneumatic feeding pipe via a blow-through rotary valve with feeding shoe and into the pneumatic injection systems feeding each kiln and subsequent combustion. It is 70m from

the fuel tower to the injection systems. Kingfisher International delivered the pipework. The company has experience in these solid fuel types and implemented wear-resistant basalt liners, such that the life-time of bends is extended six times compared to that of just using mild-steel.

Fuel processing solutions are designed by Saxlund to avoid blockages and ensure reliability, high-availability and low maintenance. Key maintenance areas, where achievable, have been installed externally to minimise disruption. This is especially true of the silo and push-floor, where complete overhauls can be carried out with a full silo.

Sustainable cement production

The new waste-derived fuel system was fired up at the Hope plant in early June 2015. The increased proportion of waste-derived fuels will allow the use of alternative fuels to be increased to above 50%, resulting in a major reduction in greenhouse gases and a reduction in the overall fuel bill. Hope Construction Materials expects to recover its investment in the next few years, once other equipment upgrades have been completed. The benefit to the UK is that the company now diverts up to 80,000t/yr of bulk solid waste away from landfill.

This work for Hope Construction Materials is an important example of what can be achieved in the cement industry. The use of waste-derived alternatives is essential for the cement industry's future. The carbon savings alone will be significant to any cement manufacturer that is committed to sustainable manufacturing and in working towards a zero-waste economy. Pressure to change is gaining momentum and there seems little to be gained in waiting to see how things develop while the more innovative manufacturers become greener and more profitable. 

Right: Push floor discharge conveyor to the screening building





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Dipl. Ing. Petr Rayman, RAYMAN spol. s r. o. Kladno (CZ)

Efficient pneumatic conveying of cement kiln dust and raw mill dust in Russia

Pneumatic conveying systems are usually considered high energy consuming systems, but this does not have to be the case if the designer chooses the right equipment concept. There exists a basic rule to use a fluid conveying system for the horizontal conveying of powder materials as much as possible. The second rule is to use a pneumatic conveying system for vertical conveying, which provides a high degree of energy saving. RAYMAN spol. s r. o. (LTD) recently designed and built a modern pneumatic conveying system for a cement plant in Russia according to these principles. The system combines horizontal fluid conveying with Fluid Conveyors and continuous vertical conveying using a Flow Feeder. The conveyed materials are cement kiln dust and raw mill dust. The new system replaced an old, dusty and unreliable system of mechanical conveyors. Here, Petr Rayman describes its installation and how it compares with the old system.

The previous conveying equipment

The Russian cement plant previously had a mechanical conveying system with a low conveying capacity of 42t/hr. The system consisted of a cascade of three screw conveyors and a bucket elevator. The kiln dust did not go evenly from the filter. Indeed, it caused the occasional overfilling of screws and the leakage of dust into the environment. Moreover, due to the high fluidity of the dust, the material very often flowed back downwards through the screws while it was being conveyed upwards.

The new pneumatic conveying system

The new pneumatic conveying equipment replaced the existing mechanical transport equipment, minimising energy consumption, increasing dust conveying reliability and avoiding the leakage of dust to the environment. That was the reason that the design included Fluid Conveyors and a Flow Feeder. The basic technical data of the pneumatic conveying system are in Table 1.

The Fluid Conveyor consists of a circular body with fluid elements at the bottom (Figure 1). The elements divide the fluidising fabric into relatively short sections. There is an exactly-defined amount of conveying air supplied into each section through the De Laval nozzle. This design permits, in contrast with airslides, full and permanent filling of the fluid conveyors by the conveyed material.

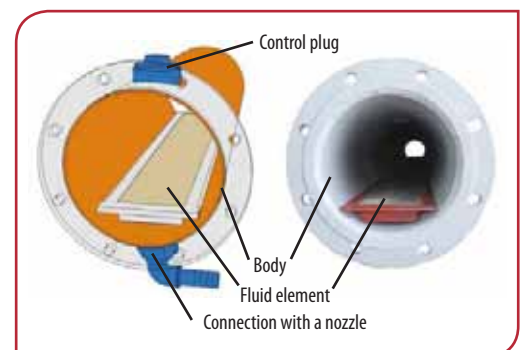
The kiln dust flows out from two screw outlets located under the kiln dust filter hoppers into the collecting Fluid Conveyor. It connects both inlet points, is lead through the platform floor and continues with a long branch into the gravity chamber of a Flow Feeder (Figure 2). The Fluid Conveyor is installed at a low inclination to its end.

Right - Figure 1: Fluid Conveyor diagram.

The Flow Feeder is designed for the economic continuous pneumatic conveying of bulk fluidisable materials. It uses pressure in the column of fluid material collected in the gravity chamber. The material creates 'hydrostatic' pressure, which is approximately in balance with the connected conveying pipeline pressure drop, as shown in Figure 3. The feeder uses a potential energy of conveyed material. It reduces distinctly of 20-50% the energy needed for material feeding compared with other types of pneumatic conveying feeders, especially screw feeders.

The gravity chamber is designed with a cylindrical shape with a diameter of 800mm and a height of 5530mm. The PP400 type Flow Feeder is located

RAYMAN spol. s r. o. has built dozens of pneumatic conveying systems in cement plants, lime plants, heating plants and power stations for the pneumatic conveying of powder materials from silos, filters and ESPs. The first Fluid Conveyor and Flow Feeder designed by RAYMAN was delivered in 1993.



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on the ground near the storage silo (Figure 4). The pipeline is vertical and is terminated in a terminal box located on the silo roof.

A Roots blower was used as a common conveying air source for the whole pneumatic conveying system for both the Fluid Conveyor and the Flow Feeder.

Process experiences

The equipment was put into service over a two-day period in April 2015 with no difficulties. Since then, it has been in service without any significant troubles.

There was a review after six months of continuous operations, when some dirt from the conveyed material was found in the Fluid Conveyor chambers. The fluidising fabrics were also polluted with grease, which came in with dust from the old mechanical conveying equipment. There were no defects or damage to the Flow Feeder itself.

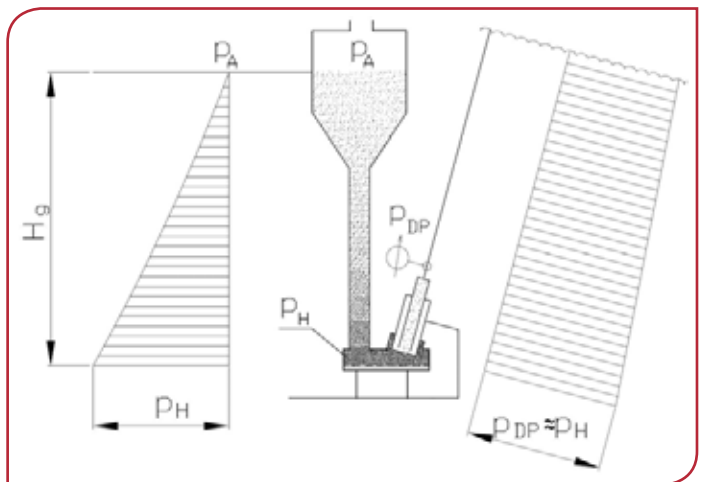
As the pneumatic conveying system does not contain any movable parts that are in contact with the conveyed material, conveying velocities are very low and the conveying pipeline is straight with only one knee of 30° angle, the whole system is highly wear resistant. Neither the Fluid Conveyor nor the Flow Feeder showed signs of wear.

During commissioning and also during the working time, it was proven that the equipment was able to convey a very quick increase of inlet dust without loss of function and without an increase in environmental pollution. The new pneumatic conveying equipment was designed to be fully leak-proof, which significantly decreased the leakage of dust to the environment from the original mechanical equipment.

Right - Figure 2: Fluid Conveyor installation.



Right - Figure 3: Scheme of Flow Feeder.



Conclusion

Comparing the old and new conveying systems of the cement plant, RAYMAN spol. s r. o. has come to the following conclusions:

- Pneumatic conveying equipment has a distinctly higher conveying capacity;
- Pneumatic conveying equipment has a lower dimension and weight, thus it requires less sturdy supports;
- As suspected, the specific energy consumption is higher for the new pneumatic conveying system, but this is fully-balanced by investment and maintenance cost savings;
- Pneumatic conveying equipment is almost maintenance-free and is highly wear-resistant;
- Pneumatic conveying equipment is fully leakage-free.

The new pneumatic conveying system combining Fluid Conveyors with the Flow Feeder also makes significant energy savings compared with other pneumatic conveying systems, especially when compared to high-pressure systems using a screw feeder or a vessel feeder.

Right - Table 1: The basic technical data of the pneumatic conveying system.

Material to be conveyed	Cement kiln dust
Bulk Density	800kg/m ³
Temperature (max.)	150°C
Designed conveying capacity (min.)	120t/hr
Conveying distance, vertical included	75m
Vertical conveying distance	35m
Blower installed electrical input	160kW
Blower input at clutch	135kW
Specific energy consumption for conveying at designed capacity	1.2kW/hr/t
Specific energy consumption of existing mechanical transport	0.82kW/hr/t



The pneumatic conveying system described here, with part of a horizontal conveying pipeline substituted by a Fluid Conveyor, could also be used, with great advantage, to convey bulk fluidisable materials from silos or hoppers. In those cases, the Flow Feeder

uses a potential energy of stored material. The Flow Feeder can be located at the Fluid Conveyor end as described above, or it is possible to place the vertical conveying equipment at the beginning and to install the Fluid Conveyor at the necessary height. It all depends on the needs of a particular installation. Fluid Conveyors can be used to convey dust from hopper filters or electrostatic precipitators (ESP) to one point and, from there, convey the dust using a Flow Feeder in a similar way, as described above.

The only disadvantage of the described pneumatic conveying system is the requirement of the in-building height to create a sufficient pressure of fluidised material. However, it is possible to solve this by moving the Flow Feeder location into a cofferdam 1-3m deep.

It is a great pity that the new equipment only replaces part of the former mechanical conveying system of dust from a filter to a silo. If the pneumatic conveying system could be used for complete dust transportation, this would prevent the disadvantages due to the combination of a mechanical and pneumatic conveying system, especially the contamination of dust and internal parts of the pneumatic conveying equipment by grease residues. The original mechanical equipment has remained very dusty, as is visible in Figures 2 and 3.

Left - Figure 4: Flow Feeder installation.



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Tim Allsup, Fuchs Lubritech

Optimum lubrication of clinker cooler chains

As with many manufacturing plants, it is important for cement plants to be profitable to survive. Most world-class companies put a major focus towards increased production, decreased unscheduled downtime and reduced maintenance and labour costs in order to increase their profitability. Providing proper lubrication to chains that operate in critical applications under extreme conditions such as in the clinker coolers of cement plants clearly falls under this focus. Here Fuchs Lubritech's Tim Allsup explains how cooler chain lubrication can be optimised.

Improper lubrication of critical chain applications has several adverse effects: Failures can occur that result in unscheduled downtime and reduced production; Reduced lubrication can increase the power draw required to move the chain, which results in higher energy costs; Increased wear on chain components can greatly reduce the chain life, resulting in high replacement costs and; Additional labour is required to keep the equipment in operation, which can impact on the maintenance budget.

This article will discuss the components of a chain, the factors that need to be considered when choosing a proper lubricant, the operating conditions for clinker cooler chains, choosing the proper lubricant as well as lubricant performance tests, application methods and the benefits of proper lubrication.

Chain components

Most chains are made up of the same components; side plates, pins and bushings. To be effective, the lubricant used must be able to penetrate into the friction points between the pin and bushings as well as between the inner and outer plates.

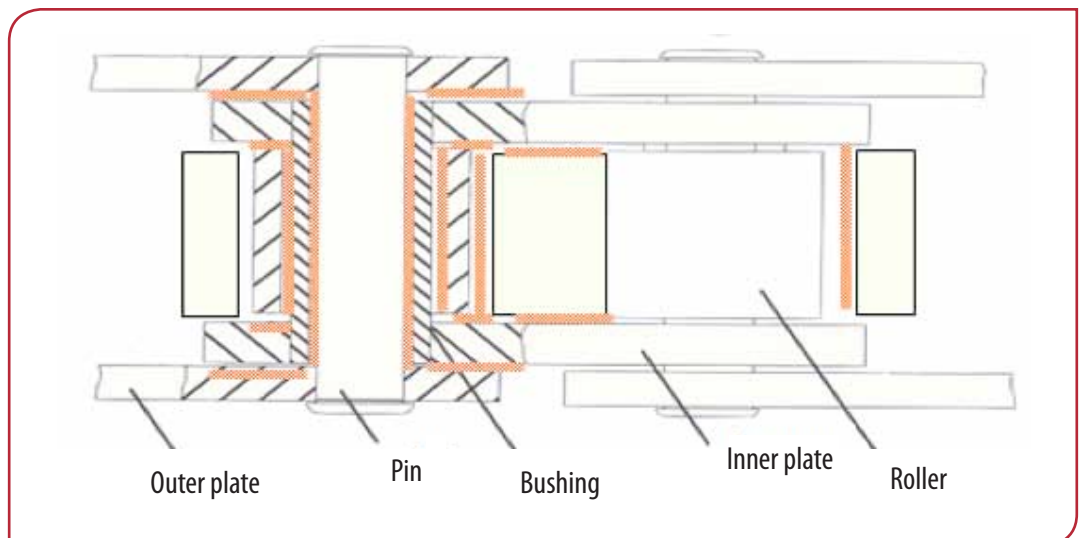
Although they have mostly the same components, the proper lubrication of a chain depends on

several factors, including load, speed, size, operating temperature, ambient conditions (wet, dry, dusty/dirty, harsh chemicals, etc...) and the method of application. A philosophy of 'One Size Fits All' clearly does **not** apply to the proper lubricant that should be used. With so many chain oils available from so many manufacturers, it is very important to consider what the best choice would be to lubricate the chains in question under the real-world operating conditions. Operators should make sure that the supplier fully understand their requirements and that it has the correct technology to meet them.

Let's take a closer look at how the various factors come into play with the choice of lubricants used to prevent failures.

Loads and size: Higher loads and larger chains generally require higher oil viscosities that can provide the correct lubrication film thickness to the load zone. The viscosity must not be too high, so that it can penetrate into the inner pin and bushings.

Speed: Chains with higher speeds can benefit from oils with tackifier additives, which resist dripping and/or flinging off due to centrifugal forces.



Right: Chain schematic.



Operating temperature: Temperature is critical in determining the oil type that a specific application should use. Most chains in normal ambient temperatures can use a mineral oil. Higher temperature applications tend to require a synthetic oil or even a dry film lubricant.

Ambient conditions: Chains that operate in dry or dusty/dirty conditions should use an oil that quickly penetrates into the pin and bushing, leaving the outside of the chain mostly dry so that it minimises the attraction of contaminants. Chains that operate in wet environments or areas with harsh chemicals should use an oil with rust and oxidation inhibitors, which will coat and protect the whole chain.

Method of application: When applying lubricants to any application, operators should always use the right lubricant, apply it to the right place, in the right amount, at the right time interval. Under most conditions, using less lubricant at shorter intervals is better than using more lubricant at longer intervals. In order to do this, most critical chain applications utilise automatic lubrication systems to apply a little lubricant frequently, as it would not be possible to manually lubricate the chain effectively. If using an automatic lubrication system, operators must consider the lubricant type and viscosity required to see if the system will correctly pump the lubricant. It is possible that one might buy the best lubricant in the world, but it is not going to work if it can't be correctly applied.

Conditions in clinker cooler chains

In clinker coolers, we typically find large, heavily loaded, slow moving chains that have to operate in high temperatures under dusty/dirty conditions. The requirements for proper lubricant choices under these conditions would be:

- Good oil penetration ability so that the inner working of the chain have adequate film thickness to reduce friction;

- Higher oil viscosity to protect the chain components under slow speeds and heavy loads, taking into consideration the viscosity limits if using an automatic lubrication system;
- A synthetic base oil, which would provide lower evaporation and less carbon residue/build up under higher temperatures;
- An additive package that reduces friction and protects against wear and corrosion;
- An oil with good adhesiveness to resist dripping and/or flinging off the chain.

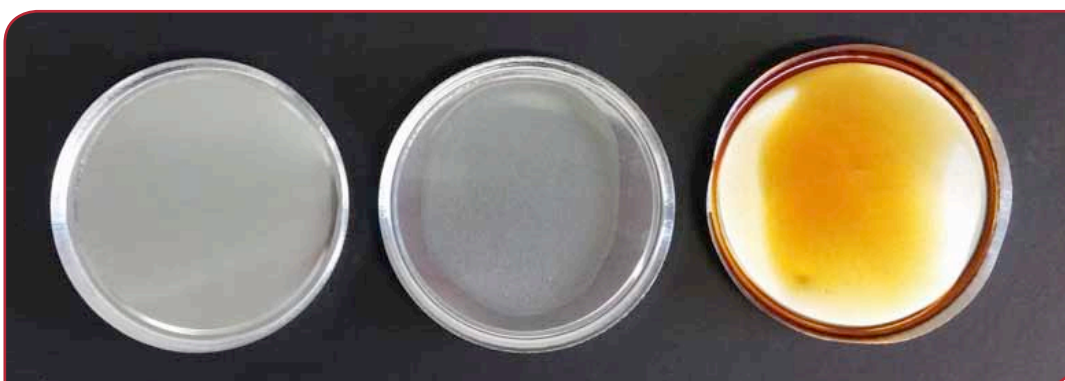
Tests to determine lubricant performance

The most recognised laboratory test to determine an oil's resistance to friction and wear, which calculates the coefficient of friction is called the SRV. This test has many variables that can be adjusted to better simulate the actual application. You can vary the loads, surface pressure, sliding distance, temperature, duration and type of contact (point, line or full surface).

Specific products can be tested against one another under the same conditions to compare results. To determine the rate of evaporation of an oil, a common test used is the thermogravimetric analyser (TGA). This test heats an oil at a specific temperature for a prescribed amount of time and determines how much oil has evaporated. The level of evaporation equates to the level of oil consumption required for an application. Specific oils can be compared to de-



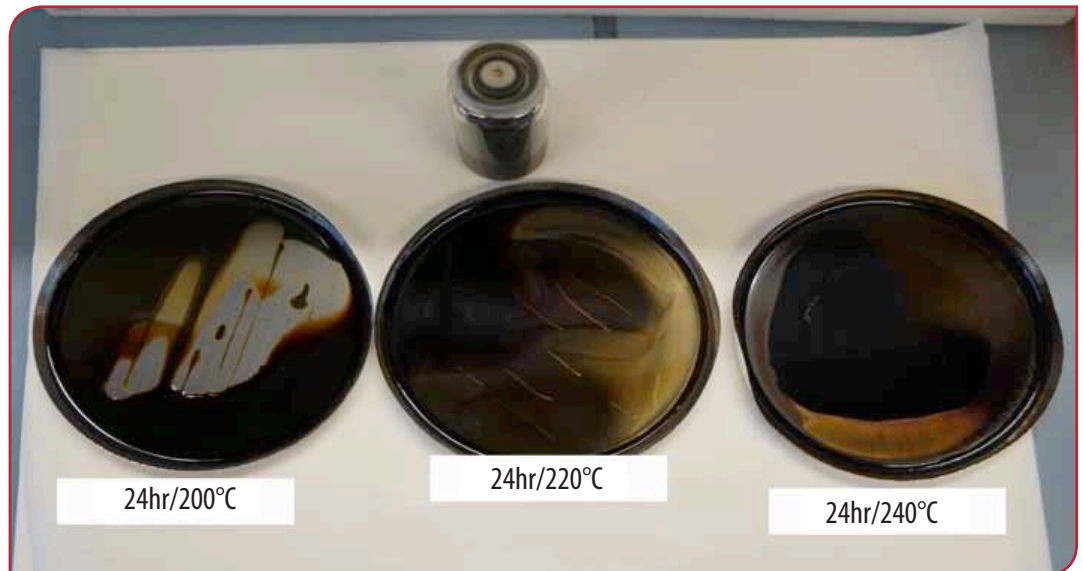
Left: Clinker coolers provide chains and their lubricants with a lot of challenges.



Left: Lubricants prior to 24-hour heating tests.



Right: Lubricant samples after 24-hour heating tests.



termine which oils evaporate faster under the same conditions. This can affect the total cost of using a specific lubricant.

Another important performance characteristic for a high temperature oil is the residue left behind as the oil evaporates or oxidises. The residue formation can be considerably different between lubricants. If the residue becomes a hard varnish it can become abrasive. This promotes wear on the chain components and hinders new oil from penetrating into the pin and bushings. Better performing oils can have a more fluid residue left behind that can redissolve when new oil is applied. The test procedure uses 2.5g of oil on an aluminium dish heated at a prescribed temperature for 24hr. The condition of the oil is then evaluated. Various oils can be compared to determine their performance levels.

Application methods

Manual lubrication: Due to obvious factors, manual lubrication is usually not the preferred method when lubricating high temperature chains. It would take a long time for a person to apply oil to the whole chain and the frequency would not be adequate, not to mention the potential risks to the person.

Automatic lubrication: The preferred method is to use an automated lubrication system. There is a wide variety of different types of system that can be used, including single line parallel, single line progressive, dual line, orifice controlled, shot to point and others.

Depending on the system type, oil can be applied to the chain in various quantities at various intervals. The preferred method would apply a small amount of oil at short intervals to give a more continuous mode of lubrication. Shot to point systems usually have an advantage over other system types as it can apply the oil in a small amount directly to the spot where it is needed, thus having the best control over total consumption of the lubricant.

It is important to note that an automatic lubrication system is like a machine. To ensure its reliability operators need to perform regular inspections for proper operation and quickly repair/replace any faulty components. Due to the harsh operating environment, the installation of the system is just as important as the operation.


An important factor to always consider when changing from one oil to another when the plant is using an existing automatic lubrication system is to make sure the new oil can be conveyed properly from that system. Operators should check the minimum/maximum oil that viscosities the system can pump. If the system cannot convey the best lubricant for the application, it may be necessary to change the lubrication system itself.

The expected benefits

When you are able to follow the simple rules of applying the right lubricant, to the right place, in the right amount, at the right interval you can expect to achieve the following benefits:

- Reduced downtime;
- Increased chain life;
- Decreased maintenance costs;
- Increased equipment reliability;
- Reduced consumption.

Conclusion

This article has hopefully provided a deeper understanding of the importance of proper chain lubrication, especially under harsh operating condition. When it comes to finding the right lubricant supplier, operators will want to consider one that can provide the engineering expertise as well as the best product performance. 



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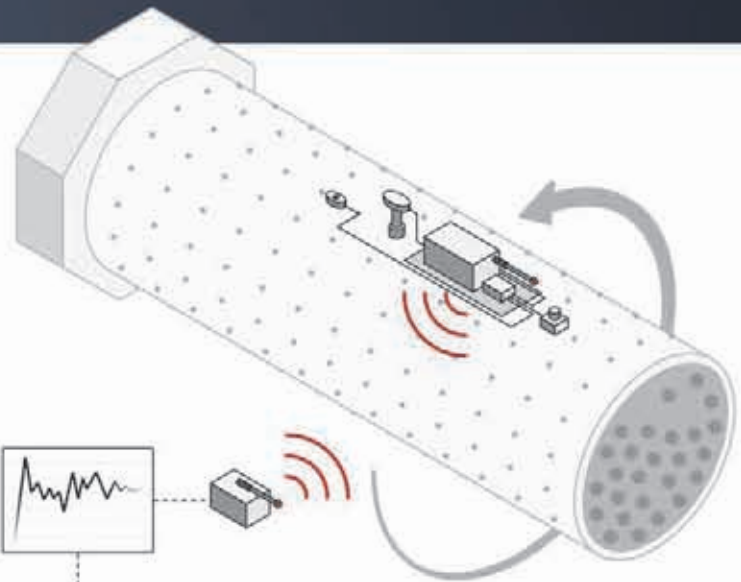
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BEUMER Group

Perfectly integrated into the environment

Portlandzementwerk Wotan H Schneider from Üxheim-Ahütte in the Volcanic Eifel, Germany, has acquired a Pipe Conveyor manufactured by BEUMER Group to transport clinker to its cement mill. The 200m-long conveying system is customised to fit into the local environment. Since the system is completely enclosed, no material can fall on the road or passing vehicles. Additionally, absolutely no dust is released into the air, which greatly benefits the environment. Furthermore, the conveyor is economical in operation, energy-efficient and maintenance-friendly.

Around 380 million years ago, huge limestone reserves accumulated in the lime dell of Hillesheim in the Volcanic Eifel region of Germany. Numerous dolomite formations and several basalt and lava cones demonstrate the geological diversity of the area. At the heart of the region lies the small parish of Üxheim-Ahütte. Portlandzementwerk Wotan H Schneider KG, informally known as Wotan Zement, has operated its plant on the outskirts of the 180-inhabitant village since 1923. The family-owned enterprise has 70 employees and produces nine types of cement, including Portland cement, Portland limestone cement, Portland pozzolana cement, blast-furnace cement and Portland slag cement. These are bagged or filled into silo trucks and transported to construction sites, ready-mix plants, concrete component manufacturers and building material traders. The enterprise mines limestone and marl in the Üxheim, Nohn, Berndorf and Kerpen quarries that all lie close together in the lime dell of Hillesheim.

“Due to increased demand for Portland cement we currently need to buy additional cement clinker. It is delivered in trucks to a specially-built clinker receiving station”, explains technical director Gerd

Morenhoven. The cement manufacturer needed an efficient solution to transport the arriving material to the mill or clinker store. “We were looking for an eco-friendly and low-maintenance solution,” adds Morenhoven. The new conveyor had to be adapted to the existing premises. For example, it had to follow the course of the access road and not lose any material during transport, even on steep slopes.

For the building material manufacturer, BEUMER Group was Wotan Zement’s first choice to supply optimal conveying equipment. The provider of conveying solutions has been well-established in the building industry for nearly 80 years. The Pipe Conveyor segment is one of BEUMER’s Centers of Competence, which are in charge of worldwide project management and sales. This specific project was carried out in close collaboration between the group companies in Austria and the Czech Republic.

Maximum environmental protection, minimum maintenance

“Together with the management team in Üxheim-Ahütte, we developed a solution that is tailored to exactly match the customer’s requirements”, says

Right: The BEUMER Pipe Conveyor at Portlandzementwerk Wotan G Schneider is customised to fit perfectly into the local environment.





Josef Amon, project manager at BEUMER Group Austria GmbH, who was responsible for the project. It became apparent that a Pipe Conveyor was the best solution to offer environmental protection and low maintenance.

Wotan Zement already has a Pipe Conveyor and the system has stood the test of time. "Its closed design reliably protects the environment from dust and people or vehicles from falling goods," explains Amon. The conveyors also offer many other advantages. They are able to



Left: Clinker is transferred onto the Pipe Conveyor at the feeding station.



navigate long distances and tight vertical and horizontal curve radii. The ability to negotiate sharp curves means that far fewer transfer towers are needed in comparison with other belt conveyors or, depending on conveying length and curve radii, even none at all. Thanks to this, the customer can significantly reduce costs and BEUMER can more easily adapt the system to specific requirements.

System design

BEUMER Group supplied and installed a system with a pipe diameter of 200mm and a length of 213m. It conveys up to 200t/hr of material. Another system advantage is the reduced noise emission of the Pipe Conveyor. Special idlers, low-noise bearings and electric motors work very quietly. "This makes for a more pleasant working environment for our employees. Additionally, the people in the vicinity are not disturbed by the noise. It is an important aspect, since the plant is located on the outskirts," notes Gerd Morenhoven.

Besides the supply and installation of the Pipe Conveyor, BEUMER also took care of all the necessary solutions to ensure flawless operation. Among other things, BEUMER equipped the conveying system with a magnetic separator.

The route of the Pipe Conveyor now runs along the access road, crosses a weighbridge, then reaches a two-way chute. There, clinker is either transported to the mill via an existing reversible belt conveyor or taken to the existing clinker store.

Constructive solutions

BEUMER Group was in charge of the entire process. BEUMER Austria took over the project implementation: its employees created the basic design and included all the systems supplied by the customer, delivered the components and commissioned the Pipe Conveyor. BEUMER Czech Republic a.s. took care of the detailed engineering, the steel structure and the installation.

"We designed the frames so that they could support the pipeline for pneumatic cement transport supplied by the customer," explains Amon. This pneumatic pipeline was part of another project. The simultaneous use of the Pipe Conveyor frames as a pipeline bridge allowed for substantial cost savings in the other project. "The challenge was to do this without additional supporting structures," he continues. Furthermore, the engineers integrated the Pipe Conveyor into the existing plant structure. "As the system was quite old, there was very little documentation left," he explains. That challenge, too, was successfully mastered by BEUMER, as Pipe Conveyors are quite easy to integrate into existing plants.

The implementation of the entire project lasted around 10 months and the system has operated successfully since February 2015. "We are very pleased," concludes Morenhoven. "The transport from the clinker receiving station to the clinker store or the mill is performed quietly, quickly and without material loss."

Left: BEUMER integrated the Pipe Conveyor into the existing system.



Burkhard Reploh, Haver Building Products and Minerals

Trends in the packing of building products

Haver Building Products and Minerals links and coordinates all the activities of Haver & Boecker within the field of building products and minerals, including processing, storage, mixing, filling, packing, palletising, loading, automation and development. Here, Burkhard Reploh, Head of Haver Building Products and Minerals, offers his take on major trends in the building products and minerals industry...

Product protection and extended shelf-life

Not only manufacturers, but also processors, professional users and end-users expect longer shelf-life capability from their products. It has to be possible to store bags outdoors over long time periods without any loss in quality. This can be achieved only when the filled product is protected against every type of external factor by the packaging. Therefore the bag needs to be sealed shut, remain watertight, especially for hygroscopic products, and be protected from UV light.

Automating smaller plants

What has long been standard for large plants is now becoming increasingly the rule for smaller operations. The demand for capacity utilisation is increasing, which is why machine availability has to increase and processes have to be matched to each other more efficiently. Automation of processes is thus becoming more profitable.

Below: Frozen fill, form and seal bags, filled on Haver & Boecker equipment and protected from the harshest of conditions.



To fulfil this need, Haver & Boecker founded Haver Automation within its own company at the beginning of 2016. The new unit serves to expand the Haver & Boecker range of performances with regards to automation solutions. This includes: Engineering, project management, commissioning and service; Process control technology, dispatch automation, batch management; overall equipment effectiveness, web solutions and status monitoring.

Trend to smaller package sizes

Especially in the DIY sector, the differentiated and, at times, finely categorised raw material marketing paths require a variety of package sizes. For small package sizes, for example, manufacturers often do not cover the entire range, but rather work with packing contractors.


Yet if they expand their range to include very small packages, then new business fields open up. For example, in the extraction and processing of gravel and sand, different grain sizes arise and they must be stored and transported in different size units – from silo to small bags. Gravel and sand as a building product or for industrial use are found in large bags, while beach sand for private use and quartz sand however are filled in pouches.

Haver Building Products and Minerals supports this trend by offering companies machines for lower weight ranges. “We have the necessary expertise in packing and palletising technology to be able to offer all machines from a single source. Our customers are aware of the quality of our systems and trust us. Why shouldn’t they ask for a machine for smaller packages? Every single packing system then covers an optimum spectrum of application for the various weight classes,” says Reploh.

Cleanliness and work safety

Those involved in the process place great value on bag cleanliness and clean surroundings, not only during filling, but also during palletising, loading, transport and storage. Optimised filling through technical improvements and high bag tear-resistance ensures clean surroundings along the entire value-adding chain. Less product loss, reduced maintenance costs, and less machine stoppage time from contamination leads to higher profitability.

Turnkey plants

With a lack of in-house resources, especially with respect to engineering, plant designers are turning increasingly to turnkey projects and engineering, procurement and construction (EPC) contracts. With respect to this, Haver Building Products and Minerals offers technologies for the future and the expertise needed to integrate them into a complete system. Haver & Boecker experts can analyse the customer’s entire plant and infrastructure with the aim of developing and achieving individual solutions from a single source. The automation solutions from Haver Automation play a decisive role here. “Every single technology is excellent, but becomes unbeatable when combined in a process chain,” says Reploh. 

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Session 3: Trouble-shooting case-studies from the global cement industry

Session 4: Maximising cement production

Session 5: De-bottlenecking for production maximisation

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Photo courtesy Lark Energy

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Photo courtesy Stephen Elliott, Hope Construction Materials



UNTHA shredding technology GmbH

Shredding innovation promises greater flexibility for the cement industry

UNTHA shredding technology GmbH has launched the XR mobil-e, the world's first electrically-driven mobile shredder, in response to demands from the cement industry for a cost-effective, environmentally-sound and flexible alternative fuel preparation solution.

The 'XR mobil-e' is the latest innovation from the Austrian-headquartered alternative fuel production expert UNTHA. With the same design features as the static XR, this mobile solution provides operators with identical benefits, including high throughput, low operating costs, energy efficiency, low noise, foreign object protection and ease of maintenance. However, it is the first machine of its kind to shred with a low power electric drive and, thanks to its on-board auxiliary power pack, it can be easily moved around a production facility and plugged back in.

The launch comes in response to requests from some of the world's leading cement producers, to manufacture an electrically-driven mobile solution without any of the disadvantages commonly associated with such machinery. Conventional diesel-driven mobile shredders may present on-site flexibility in indoor and outdoor locations, but the level of maintenance required, not to mention high operating costs, can restrict the return on investment from such equipment.

UNTHA's product manager Christoph Lahnsteiner explains, "In the modern alternative fuel production environment cement companies need to be fluid and responsive in their operations. But they shouldn't be financially penalised for this. Supplied on tracks and with an in-built discharge conveyor

and ferrous magnet, this solution is a cost and energy efficient solution that can be moved with ease. With the help of a low loader, the XR mobil-e can even be completely relocated from one site to another, depending on the waste company shredding the municipal solid waste (MSW) or commercial and industrial (C&I) waste materials for the cement firm at a given time."

The XR's ability to handle a range of input materials further heightens the flexibility of this mobile machine. MSW, C&I waste and other bulky materials can be shredded with ease to produce a wide number of high quality fuels for calciners and main burners. A series of interchangeable screens and cutters enables the shredder to be configured according to the output specification, with homogeneous particles of 30-400mm achievable.

"Waste streams change, especially in countries with a more fragmented approach to waste collection and management," continues Lahnsteiner. "To ensure utmost resource security for cement kilns, technology must be able to adapt to the needs and demands of the market, at a given time, without the need to invest in additional capital assets. We really believe 2016 is the year the alternative fuels market starts to work even smarter, to tick more environmental and bottom line boxes."



Right: The new UNTHA XR mobil-e in action.





Germany: High-performance truck bag loader with above-average machine availability

HAVER & BOECKER has expanded its bag handling product range for bulk products. The HAVER SpeedRoad is a compact, efficient, economic and fully automatic system for loading filled bags directly onto trucks. The truck loader is the result of decades of experience in packaging, filling, loading and shipping. As an improved version of known systems, it has positioned itself on the market within a very short period and has already been delivered to customers in Africa and Asia.

The HAVER SpeedRoad assembles the bags that come from the conveyor belt of a packing machine to form a stacking pattern inside the machine. It then puts them down onto the truck in layers, ensuring a perfect layer pattern. Once the truck has been



The HAVER Speedroad seen loading a truck from above..

loaded, the packing machine moves into waiting position until the next truck arrives.

With the HAVER SpeedRoad, 3000bags/hr can be loaded onto trucks in stable stacks. It is suitable for different types of trucks and bags and provides for selectable loading patterns. It is also possible to load pre-positioned empty pallets onto the truck.

The system is an electromechanical system – without hydraulics and pneumatics. Its low installation height is particularly advantageous in case of plant modernisations or retrofits. A user-friendly touch panel control and optional camera monitoring facilitate the operation of the loading system which is easy to maintain due to its optimal access.

UK: Renold Couplings launches new ranges

Renold Couplings has announced it will launch two new product ranges of couplings at the Drives & Controls exhibition in April 2016. Both couplings are designed for industrial couplings such as those in mines and quarries.

The Hi-Tec RBI range will extend the existing RB range by incorporating a new block profile to increase torque throughput by 50%. As with the existing industrial RB range, the new Hi-Tec RBI will be available off the shelf. The new Hydrastart range will now come complete with Renoldflex coupling. This addition will be 'drop-in' so the drive assembly can remain in place, allowing the Hydrastart to be swapped out.

Sweden: SKF offers new Lincoln electrically driven lubricator

SKF has announced the introduction of the Lincoln electrically driven lubricator (EDL1). Utilising progressive metering devices, the EDL1 has been developed for usage in sectional lubrication systems as well as in large machines with different lubrication requirements at varying distances.

This easy to use dosage and pressure-booster pump is designed to increase input pressure of at least 2 bar (29 psi) up to a maximum of 280 bar (4,061 psi). As an affordable lubrication solution, the EDL1 can be used with existing tubing, fitting material and filling pumps.

The EDL1 operates effectively in challenging environments, including outdoor applications with fluctuating temperatures. Because lubricant is supplied by means of filling pumps or cartridges, the device provides flexibility and self-sufficient function, even in remote locations. The EDL1 features an integrated control board for both impulse and time controlled lubrication and is able to notify lubrication failures.

The EDL1 is suitable for food and beverage and railroad applications, as well as cement and other heavy industries. It also can be utilized in many industrial applications that require an affordable sectional lubrication system.

Germany: Silo for Rheinkalk

Rheinkalk GmbH has commissioned Silobau Thorwesten with the construction of a new fuel silo for the rotary kilns used for the production of quicklime in Europe's largest lime plant, Flandersbach, close to the Wuelfrath district of Rohdenhaus. The four rotary kilns used for limestone refining have so far been heated with quicklime from two large-capacity silos. In order to secure a consistent fuel supply for the future, the company decided to install another storage and dosing system. Thus in March 2016 a third silo was put into operation, equipped with the latest technology in regard to level measuring, filling, discharge, and explosion protection. Rheinkalk chose Silobau Thorwesten as its supplier, as a company specialised in the field of silo building for potentially explosive materials. For instance the 42m tall silo has an explosion pressure shock resistant design and is equipped with ATEX-conform explosion vents and de-dusting filters from their associate company Thorwesten Vent, in order to guarantee maximum security while handling combustible pulverised coal.





Global factors will bear on all of us in the rest of 2016...

Koen Coppenhelle Chief Executive of CEMBUREAU, the European Cement Association



The CEMBUREAU Quarterly Economic Report for the fourth quarter of 2015 shows that no EU country experienced a recession in 2015. However, the latest quarterly data revealed that economic growth did not gain momentum in the fourth quarter on a quarterly basis. Only very modest growth rates were recorded in all major EU economies, for example 0.3% in the EU28 and Germany, 0.2% in France and 0.1% in Italy. There are growing fears of a deterioration in the macroeconomic environment, risks of continuing deflation, despite unprecedented European Central Bank (ECB) action and several factors of uncertainty that have cast a shadow on growth prospects for 2016. Supportive external factors, including oil prices, the ECB's Quantitative Easing (QE) and Euro devaluation have yet to boost economic growth and investment as expected.

The latest leading indicators for the construction sector continued to show mixed signs and diverging developments in major Eurozone economies, but, as a whole, the sector showed levels of activity that are still rather low, despite the fact that recovery has been in place in many Member States since the second half of 2013.

Construction investment data continued to show a clear disconnection between construction and macro-economic cycles in the fourth quarter of 2015, the latter

recovering much faster than the construction sector, which is lagging behind the economic recovery.

Real construction investment increased on a quarterly basis in all individual major Eurozone economies, particularly in Italy. As already observed in the third quarter of 2015, there are widespread signs of recovery in housing demand across the EU, mainly from quarterly rises in residential property prices, although we are still very far from the peaks recorded before the crisis. However, record low mortgage interest rates, thanks to continued quantitative easing, improving domestic demand in EU countries and the recent wave of immigration into the EU are all potentially supportive factors of housing demand. As far as civil engineering is concerned, the ECB's QE allows more room for government infrastructure spending, essentially through a massive reduction of Member States' sovereign interest rate burden.

2015's fourth quarter cement manufacturing indices seemed to have reversed the trend observed over the past quarters as they recorded sharp increases in all the countries observed, albeit still remaining around very low levels in historical terms.

On top of this, a gloomier economic picture may be coming up next for the EU and the wider world. There were worrying signs in the fourth quarter of 2015, including a slowdown in Chinese GDP growth, repeated

Shanghai stock exchange plunges in January 2016 and sharp devaluation of the Chinese Yuan. Brazil and Russia were in deep recessions in 2015, with real GDP falls of 3% and 3.8% respectively. The oil price bonanza is beneficial for EU industry, but much less so for EU exports, as it means lower demand from commodity-producing countries like Brazil, Venezuela and Russia. Current oil prices are likely to prove rather destabilising for these countries, thus hampering global economic growth. Last but not least, growing geopolitical tensions (Syria, Libya, IS threat), as well as some political uncertainty on the future of the EU (including a possible 'Brexit, and the ongoing refugees influx) contribute to continued economic uncertainty.

Below: EU cement production index (Q1 2005 = 100) and year-on-year change (%) for 2006 - 2015.

Cement production index —■—
Year-on-year change —■—



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Secured double valve airlock with sliding gate



Switzerland/World: LafargeHolcim cement sales stay static in 2015

Switzerland: LafargeHolcim's sales volumes of cement remained static at 255.7Mt in 2015, up by 0.2Mt compared to 255.2Mt in 2015. However, the group's overall net sales across all businesses fell by 6.2% year-on-year to Euro26.8bn from Euro28.6bn. It described having faced challenging emerging markets in China and Brazil and that it plans to further cut costs to cope with this.

"In a challenging environment in selected markets, we have exceeded all our 2015 commitments in terms of CAPEX, synergies, and net debt reduction.... We have also made significant progress on our divestment plan, while accelerating the pace of integration across the group and cost management actions," said Eric Olsen, the CEO of LafargeHolcim. He added that the group has taken action to cut costs particularly in 'difficult' markets. It expects to see demand in its markets grow by 2-4% in 2016.

For the fourth quarter of 2015, LafargeHolcim reported that its sales volumes of cement rose by 4.8% year-on-

year to 66.5Mt from 63.4Mt. Overall net sales fell by 5.9% to Euro6.78bn from Euro7.21bn. Its operating earnings (EBITDA) fell by 33% to Euro900m from Euro1.34bn. The group recorded a net loss of Euro2.61bn in the fourth quarter of 2015 including a Euro2.73bn charge due to asset impairment and other costs.

By region for the 2015 financial year, the group reported static sales volumes of cement of 123Mt in its Asia Pacific region driven by growth in the Philippines, Vietnam and Indonesia. Sales declined in Indian and China. Sales volumes fell by 4.7% to 42.1Mt in Europe led by a poor construction market in France despite growth in the UK and Romania. Volumes fell by 1.2% to 27.9Mt in Latin America mainly due to the economic situation in Brazil. Sales volumes grew by 1% to 43.4Mt in the Middle East Africa region as some countries in the region failed to cope with low oil prices. Volumes grew by 4.2% to 21.8Mt in North America propelled by economic recovery in the US.

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Russia: Eurocement changes loans

Eurocement and Sberbank CIB, Sberbank's corporate and investment banking business have agreed on conditions for restructuring the company's loan portfolio. The restructuring involves postponing the repayment of loans worth a total of US\$592m and US\$360m for up to six years, as well as optimising interest rates for the company's loan portfolio at Sberbank.

"Sberbank CIB is a strategic partner of Eurocement. This agreement will help us cut debt servicing costs and minimise the influence of negative macroeconomic factors on our company," commented Mikhail Skorokhod, President of Eurocement. The conditions for restructuring the debt portfolio will enable Eurocement to take a more flexible approach to financing its operational activities and help it achieve strategic goals.

Turkey: Batıçim orders burning system from FCT Combustion

Batıçim Batı Anadolu Çimento Sanayii A.Ş. has ordered a burning system firing pet-coke, fuel oil and alternative solid fuels from FCT Combustion. The order follows a long relationship with the Turkish market by FCT. The specialist industrial combustion and process engineering company first worked with a certified manufacturing partner in Istanbul in 1999.

Greece/World: Titan sales rise by 20.7% to Euro1.4bn in 2015

Titan's turnover grew by 20.7% year-on-year to Euro1.14bn in 2015 from Euro1.16bn in 2014. Its net profit rose by 9.1% to Euro33.8m from Euro30.9m. The cement producer attributed the result to growth in the US market.

Despite rising turnover in the fourth quarter of 2015 the group reported a net loss of Euro2.4m down from a net profit of Euro0.4m in the fourth quarter of 2014. This was due to its subsidiary Titan America suspending construction of a cement plant in Castle Hayne, North Carolina, resulting in a Euro12.4 impairment charge due to the suspended investment.

By region the group reported that its total turnover for Greece and Western Europe in 2015 fell by 5.6% to Euro269m, mainly due to the continued depression in the construction market in Greece. Turnover in the US grew by 45% to Euro680m, supported by a growing residential housing market particularly in the south east of the country. In Southeastern Europe turnover remained static at Euro209m. In Egypt cement demand grew by 5% but low prices in the second half of the year reduced profits. Turnover increased by 22.3% to Euro241m in this territory.

Group net debt rose by Euro81m in 2015 to Euro621m, due to high capital expenditure in 2015, the acquisition of a minority stake in Antea in Albania and the strengthening US Dollar.

Germany: KHD's Cnossen resigns

Germany: Johan Cnossen has resigned as the Chief Executive Officer and a member of the Management Board of KHD with immediate effect from 11 March 2016. He cited personal reasons. Other Management Board members will take over his responsibilities for an interim period.

Turkey: Loesche delivers mobile plant

Clarient Germany has purchased the first mobile Loesche grinding plant to grind bentonite at its Balikesir facility in Turkey. Clarient required a mobile plant because the site is due to be relocated. The mill is integrated into seven ISO containers, all the electrical connections between the containers are pluggable and no foundations are required for its erection on solid ground. The mill is expected to be commissioned in May 2016.

The vertical roller mill uses a type LM 9.2 D mill, designed for grinding industrial minerals and it has a capacity of 1.8t/hour, with power consumption of 45kW. The Balikesir facility grinds bentonite, which is ground to a fineness of 30% R 0.063. All grinding plant components from the open loop control to the feed bin, the crusher, the mill with classifier, the hot gas generator, the filter, the fan and the pneumatic product transport are placed in containers.

Clarient is a global leader in specialty chemicals. Its headquarters are in Muttens near Basel in Switzerland.



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Ireland/UK: Quinn Cement builds at Warrenpoint to access UK market

Quinn Cement and the Warrenpoint Harbour Authority (WHA) have signed contracts to build five cement silos at Warrenpoint Harbour with a total storage capacity of 7500t dedicated to the export of bulk cement from Quinn Cement to the UK market. The 10-year deal will see WHA invest Euro3.2m into the project. Work on the project is due to commence immediately, with completion expected in September 2016.

"This is a very significant development for the business, which will allow us to provide an even stronger service offering to our UK customers as well as creating additional local job-opportunities servicing the growing UK construction sector," said Liam McCaffrey, CEO of Quinn Industrial

Holdings Limited, the holding Company for Quinn Cement.

Quinn Cement is currently in the process of extending its storage and distribution centre at Crown Wharf in Rochester, UK where it is constructing two additional storage silos to bring its total capacity at Rochester to 7400t. Construction of that extension is due to be completed at the end of March 2016. Additionally, Quinn Cement is in discussions with regard to setting up a second import facility on the UK mainland.

An FLSmith ATOX mill rebuild project at Quinn Cement is pictured right.



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Italy: Antitrust body approves Cementir Italia purchase of Sacci

Cementir Italia has had its Euro125m offer to purchase Sacci SpA approved by the Italian Antitrust Authority, the company has said in a statement. The competition body gave its approval to Cementir Italia's owner, Cementir Holding.

Cementir Italia submitted its offer for the business in November 2015. The target assets comprise five cement production plants in central and northern Italy, three terminals, several ready-mixed concrete facilities, most of which in central Italy, a transport service and some equity interests in other companies.

Cementir Italia will pay part of the acquisition price upon closing of the transaction and the remainder within 24 months from completion, Cementir said in a previous statement. The first part of the payment is subject to adjustment, it added. Cementir plans to finance the acquisition with new and existing debt.



Ireland/World: CRH operating profit grows by 39% to Euro1.28bn in 2015

CRH's operating profit has grown by 39% year-on-year to Euro1.28bn in 2015 from Euro917m in 2014. Its sales revenue grew by 25% to Euro23.3bn from Euro18.9bn. Favourable weather, encouraging markets and currency benefits were all attributed to the positive result.

"As a result of good performance from our heritage businesses and contributions from acquisitions, 2015 was a year of significant profit growth for CRH. Strong cash generation resulted in our year-end debt metrics being ahead of target, and we are well on track to restoring these metrics to normalised levels during 2016. Recently there has been some uncertainty about the pace of global growth. Our focus remains on consolidating and building upon the gains made in 2015. Against this backdrop, we believe 2016 will be a year of continued growth for the Group," said Albert Manifold, chief executive of CRH.

The group's Europe Heavyside division, which includes cement, reported a fall of 8% year-on-year to Euro3.61bn in 2015 from Euro3.93bn in 2014. Operating profit fell by 11% to Euro135m from Euro151m. Challenging business conditions were noted in Switzerland, France, Germany and Finland.

CRH reported that trading results of its acquisitions from Lafarge and Holcim were above expectations. Good performances were noted in the UK, Europe and the Philippines. However, market challenges were encountered in France, Germany and Brazil. CRH completed its purchase of Lafarge and Holcim's European and American assets on 31 July 2015 and purchased assets in the Philippines on 15 September 2015.

In 2016 CRH expects continued growth in the US and in Asia, and growth in parts of Europe including the UK, Ireland and the Netherlands. More difficult market conditions are anticipated in Switzerland, Belgium, Germany and France.

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Portugal/World: Cimpor reports loss

Cimpor has reported a loss of Euro71.2m in 2015 down from a profit of Euro27.2m in 2014. Sales fell by 4.3% to Euro2.49bn from Euro2.60bn. Sales volumes fell by 6% to 28.1Mt from 30Mt. Cimpor attributed the loss to an economic downturn in Brazil and to unfavourable exchange rates.

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Peter Edwards, *Global Cement Magazine*

An update on the German cement sector



With Powtech, bauma and Hanover Fair all taking place in Germany in April 2016, *Global Cement Magazine* turns its attention to Germany. New challenges and opportunities could be on the horizon for the cement sector, due to a gradually improving economic outlook and following the arrival of up to 1 million migrants into Germany in 2015.

Germany has one of the most modern, efficient and environmentally-conscious cement industries in the world. Production began in 1877 and volumes grew rapidly. In the first part of the 20th Century this was spurred on by extensive war efforts and rebuilding following the Second World War.

The sector was badly affected by the oil crises of the 1970s, which led to two major shifts in production. The first was to larger and more thermally-efficient dry production lines that saw average cement kiln capacities grow from 350t/day to 2400t/day. The second was the start of initial investigations into the use of alternative fuels for cement production, the legacy of which is very evident today.

Recent consumption and production trends

According to the Verein Deutscher Zementwerke (VDZ), German cement consumption grew by 2.2% year-on-year to 27.1Mt in 2014. This followed a 1.1% fall to 26.5Mt in 2013, which was attributed to bad weather that limited construction sector activity. Domestic cement demand was almost completely covered by German manufacturers in 2014. Just 1.3Mt, or 4%, was imported. Cement and clinker exports fell slightly year-on-year to 6.2Mt. This takes German cement production to 32Mt in 2014.

In 2015 domestic production by VDZ members decreased by 2.0% to 24.8Mt, compared to 25.3Mt in 2014 (See Figure 1). Production is around the same level as seen 10 years previously in 2005, prior to the onset of the global financial crisis, although modern levels are considerably down on the record 38Mt produced in 2000. The drop in cement demand following 2000 has been attributed to a slow-down of the construction sector due to unfavourable demographic and tax frameworks, reduced investments and a drop in public and state-funded construction projects.

However, the second half of 2015 was considerably stronger than the first half, relative to 2014 (See Figure 2). While the first quarter sales were down by 9.7% year-on-year compared to 2014, the second and third quarters saw year-on-year decreases of just 1.8% and 1.6% respectively. The fourth quarter saw a year-on-year rise of 3.7% compared to 2014 levels. This may have been in part due to unusually warm weather in the fourth quarter, which allowed higher

than usual levels of construction for the season.

Introduction to cement market

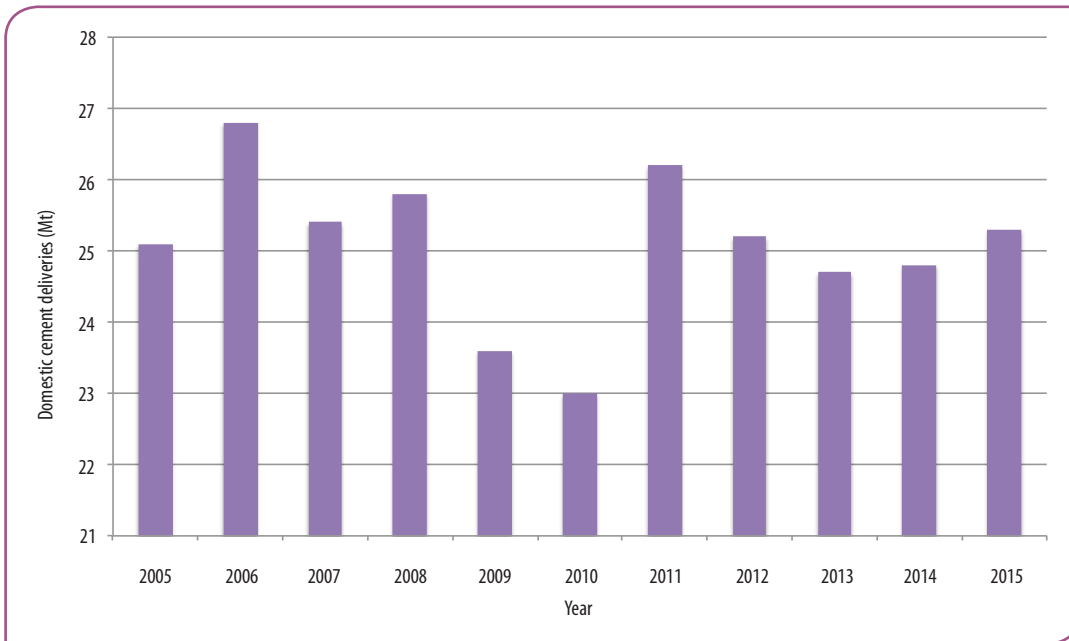
The German cement industry has 34 integrated cement plants and around 32Mt/yr of integrated cement production capacity (See Figure 3). There are also 21 grinding plants. The market includes a mix of large multinational producers, large domestic manufacturers and companies that own single plants.

The five multinational producers, Heidelberg Cement, Dyckerhoff (Buzzi Unicem), Lafarge-Holcim, Opterra (CRH) and Cemex, share 21.3Mt/yr of capacity, or approximately 67% of the total integrated capacity. Schwenk Zement, the only predominantly local player that operates more than one integrated plant, operates four integrated plants and has 4.1Mt/yr of capacity, around 13% of national capacity. The remaining 6.3Mt/yr (20%) comprises German producers with just one integrated plant. This high proportion of what are often independent and family-owned cement producers is highly unusual in a cement market as large and as developed as that of Germany. It is one of the most diverse cement sectors in the EU.

Top six cement producers

HeidelbergCement: Germany's HeidelbergCement is the largest cement producer, with eight plants in the country and a production capacity of 7.6Mt/yr. This represents 23.7% of Germany's total cement production capacity. HeidelbergCement also has five grinding plants; Königs Wusterhausen (Brandenburg), Mahlwerk Mainz (Rhineland-Palatinate), Ennigerloh (North Rhine-Westphalia), Geseke (North Rhine-Westphalia) and Hanover (Lower Saxony).

Dyckerhoff AG: Germany-based Dyckerhoff, which is part of Italy's Buzzi Unicem, is the country's second-largest cement producer, with five integrated plants and 4.5Mt/yr of production capacity, inclusive of white cement. Dyckerhoff also has three grinding plants; its white cement grinding plant in Neuss (North Rhine-Westphalia), a grinding plant in Neuwied (Rhineland-Palatinate) and another in Wiesbaden (Hesse).



Left - Figure 1: Cement production by VDZ member companies, 2005 - 2015.
Source: The VDZ.

LafargeHolcim: Formed by the merger of Lafarge and Holcim in July 2015, LafargeHolcim is Germany's third-largest cement producer. It has four plants in Germany, with a combined production capacity of 4.3Mt/yr and a grinding plant in Bremen. All are former Holcim facilities. The Lafarge facilities were sold to CRH in 2015. (See 'Opterra,' below).

Schwenk Zement: Schwenk Zement is the country's fourth-largest cement producer with an installed capacity of 4.1Mt/yr across four cement plants.

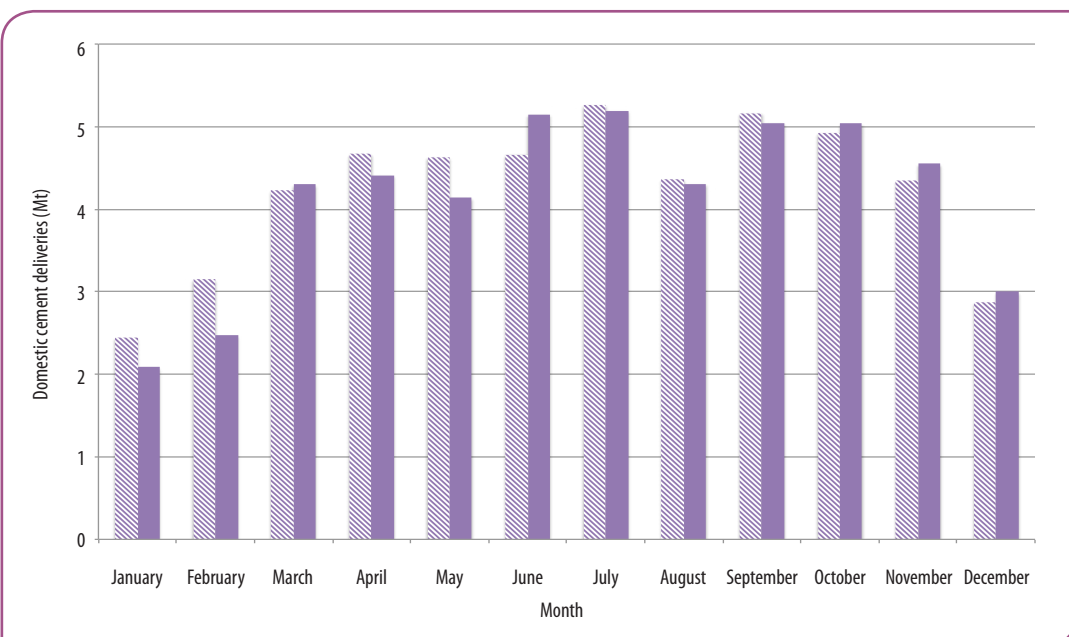
Opterra: Opterra is the new name for CRH's assets in Germany, which it acquired following the acquisition of the former Lafarge's German assets in August 2015.

Opterra operates two integrated cement plants that have a combined production capacity of 3.10Mt/yr. It also bought the Sötenich grinding plant in North Rhine-Westphalia.

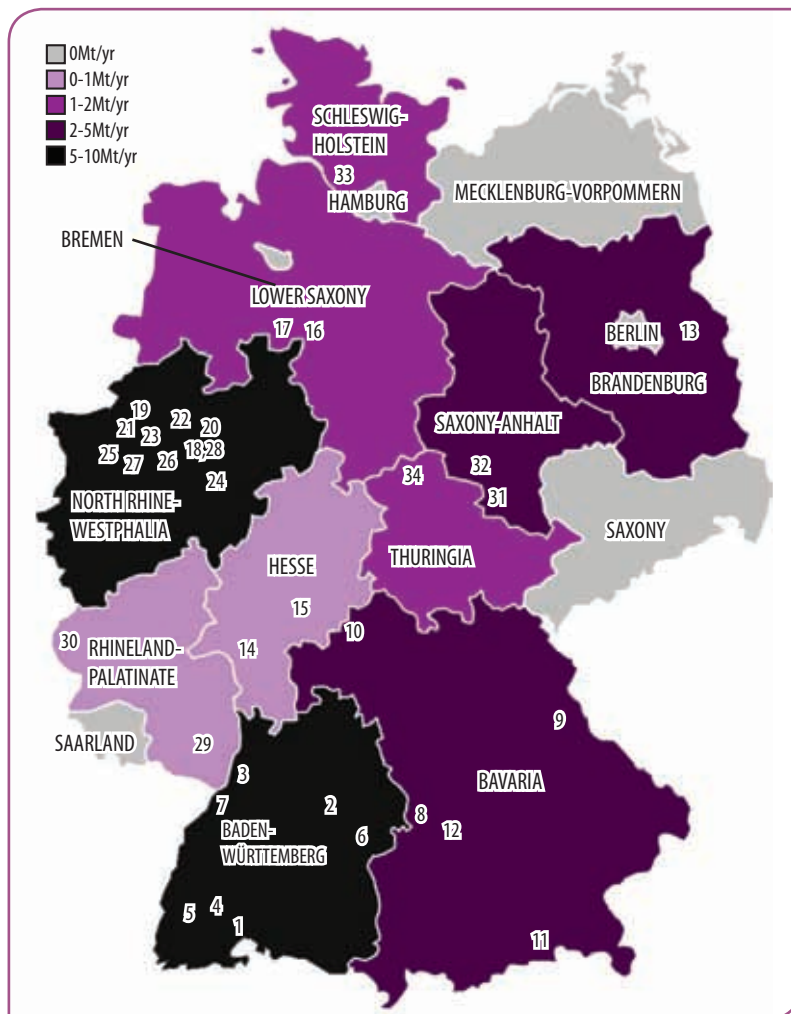
Cemex: Cemex Deutschland, part of Mexican giant Cemex, has one cement plant in Germany at Rüdersdorf with 1.9Mt/yr of production capacity, making it Germany's sixth-largest cement producer. The company also operates three grinding plants, at Dortmund and Duisburg (both North Rhine-Westphalia) and Eisenhüttenstadt (Brandenburg).

Alternative fuels

Coal was the fuel of choice for German cement plants during its first 100 years. This has been increasingly



Left - Figure 2: Monthly cement production by VDZ members, January 2014 - December 2015.
Source: The VDZ.



BADEN-WÜRTTEMBERG (6.9Mt/yr)

1. Schwenk Zement, Allmendingen, 1Mt/yr
2. Schwenk Zement, Mergelstetten, 1Mt/yr
3. HeidelbergCement, Leimen, 0.8Mt/yr
4. HeidelbergCement, Schelklingen, 1.5Mt/yr
5. LafargeHolcim, Dotternhausen, 0.8Mt/yr
6. Märker Zementwerke, Harburg, 1Mt/yr
7. Opterra (CRH), Wössingen, 0.8Mt/yr

BAVARIA (4.6Mt/yr)

8. Schwenk Zement, Karlstadt, 1.2Mt/yr
9. HeidelbergCement, Burglengenfeld, 1.1Mt/yr
10. HeidelbergCement, Lengfurt, 1Mt/yr
11. Südbayerisches Portland Zementwerk, Rohrdorf, 0.9Mt/yr
12. Solnhofer Portland Zementwerke, Solnhofen, 0.4Mt/yr

BRANDENBURG (1.9Mt/yr)

13. Cemex OstZement, Rüdersdorf, 1.9Mt/yr

HESSE (0.4Mt/yr)

14. Dyckerhoff (Buzzi), Amöneburg, 0.2Mt/yr (White)
15. Zement und Kalkwerke Otterbein, Großelüder, 0.2Mt/yr

LOWER SAXONY (1.9Mt/yr)

16. LafargeHolcim, Höver, 1Mt/yr
17. HeidelbergCement, Teutonia, 0.9Mt/yr

NORTH RHINE-WESTPHALIA (9.4Mt/yr)

18. Dyckerhoff (Buzzi), Geseke, 0.4Mt/yr
19. Dyckerhoff (Buzzi), Lengerich, 1.8Mt/yr
20. HeidelbergCement, Paderborn, 0.4Mt/yr
21. HeidelbergCement, Ennigerloh, 1Mt/yr
22. Seibel und Söhne, Erwitte, 0.6Mt/yr
23. Portland Zementwerke Gebr. Seibel, Erwitte, 0.6Mt/yr
24. Portlandzementwerke Wittekind Hugo Miebach Söhne, Erwitte, 1Mt/yr
25. LafargeHolcim, Kollenbach, 1Mt/yr
26. Spenner Zement GmbH & Co KG, Duisburg, 1Mt/yr
27. Phoenix Cement, 0.5Mt/yr
28. HeidelbergCement, Geseke, 0.9Mt/yr

RHINELAND-PALATINATE (1.0Mt/yr)

29. Dyckerhoff AG (Buzzi Unicem), Gölheim, 0.8Mt/yr
30. Portland Zementwerk Wotan H Schneider, Üxheim, 0.2Mt/yr

SAXONY-ANHALT (3.2Mt/yr)

31. Schwenk Zement, Bernburg, 0.9Mt/yr
32. Opterra (CRH), Karsdorf, 2.3Mt/yr

SCHLESWIG-HOLSTEIN (1.5Mt/yr)

33. LafargeHolcim, Lägerdorf, 1.5Mt/yr

THURINGIA (1.3Mt/yr)

34. Dyckerhoff (Buzzi), Deuna, 1.3Mt/yr

replaced by petcoke and alternative fuels since the 1970s, with much of the development in the use of alternative fuels coming in the 1990s.

This relatively early start with alternative fuels has led to one of the highest alternative fuel substitution rates in the world. Given the size of the industry, the German cement sector is very likely the most prolific consumer of alternative fuels by volume of any cement industry in the world.

In 2014, the most recent year for which the VDZ provides data, the German cement sector used alternative fuels for 63.4% of its thermal energy requirements (See Figure 4). This is 58.6 million GJ/yr. The second most used fuel was lignite (9.6%), followed by coal (9.6%) and petcoke (4.4%). A breakdown of the volumes and average calorific value of the various wastes used by the German cement industry in 2010 - 2014 is shown in Figure 4. This shows that German alternative fuel consumption has remained static within 2.4% over the five year period. Whether the small apparent up-tick in alternative fuel use between 2013 and 2014 continued into 2015 will only be known when the VDZ releases new data.

In a sign that German cement producers will continue to innovate, Joule, a producer of liquid fuels from recycled CO₂, and HeidelbergCement announced a partnership to explore the application of Joule's technology to mitigate carbon emissions in cement manufacturing in December 2015. A successful partnership between Joule and HeidelbergCement could result in the co-location of Joule's Helioculture Technology at one or more HeidelbergCement sites. It is not clear whether or not the first project would be in Germany itself or at one of the group's plants elsewhere.

As part of the agreement, emissions from various HeidelbergCement plants could provide Joule with the waste CO₂ required to feed its advanced Helioculture platform. The system directly and continuously converts sunlight and waste CO₂ into infrastructure-ready fuels, including ethanol and alkanes that serve as highly blendable feedstock for diesel and jet fuel products.

Plant projects and recent news

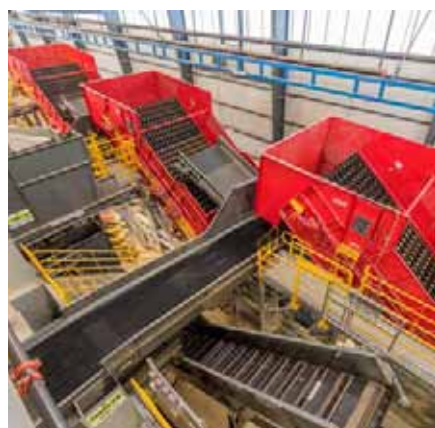
HeidelbergCement has decided to modernise its Burglengenfeld cement plant with parts and services from IKN and Gebr. Pfeiffer.

IKN won the contract for the engineering, supply and installation of a complete 4000t/day pyro-processing line, from raw meal feeding to clinker discharge. The new line will consist of a two-string, five-stage preheater tower with inline

Above and Left - Figure 3: The integrated cement plants present in Germany in 2016. The states are colour-coded by cement production capacity, inclusive of white cement plants.

Source: The Global Cement Directory 2016.

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Right - Table 1: The top cement manufacturers in Germany in 2016. **Source:** The Global Cement Directory 2016.

Company	Plants	Capacity (Mt/yr)
HeidelbergCement	8	7.6
Dyckerhoff (Buzzi Unicem)	5	4.5
LafargeHolcim	4	4.3
Schwenk Zement	4	4.1
Opterra (CRH)	2	3.1
Cemex Deutschland	1	1.9

Right - Table 2: The top cement producing states in Germany in 2016. **Source:** The Global Cement Directory 2016.

State	Plants	Capacity (Mt/yr)
North Rhine-Westphalia	11	9.5
Baden-Württemberg	7	6.9
Bavaria	5	4.6
Saxony-Anhalt	2	3.2
Brandenburg	1	1.9
Lower Saxony	2	1.9

calciner. Among several innovative features will be a tertiary air duct damper and an IKN Pendulum Cooler.

As part of the modernisation of the kiln line, the four existing MPS vertical roller mills will be replaced after 40 years of successful operation. HeidelbergCement has ordered two new Gebr. Pfeiffer MPS 4250 B roller mills as replacements. Each mill is designed to achieve a capacity of 200t/hr of cement raw material ground to a fineness of 12% R90µm. Raw mill 1 is scheduled to go on stream at the end of 2016 and raw mill 2 is scheduled to start operations in 2017.

Right - Table 3: Volumes and average calorific value of the alternative fuels used by the German cement industry in 2014. **Source:** The VDZ.


Italcementi's CEO Carlo Pesenti said, in September 2015, that the acquisition of Italcementi by HeidelbergCement is expected to be completed in the first half of 2016. Pesenti said that he will join the supervisory board of HeidelbergCement and plans to keep an active role in the company.

In order to help it finance its acquisition of Italcementi later in 2016, HeidelbergCement successfully issued debt certificates in the amount of Euro625m in January 2016, further strengthening

its financing structure. The proceeds will reduce the volume of the bridge financing from Euro3.3bn to Euro2.7bn.

Schwenk Zement has recently brought into operation two new Liebherr R 980 SME crawler excavators at its limestone quarry in Heidenheim an der Brenz. The crawler excavators are deployed together with a wheel loader directly at the quarry wall.

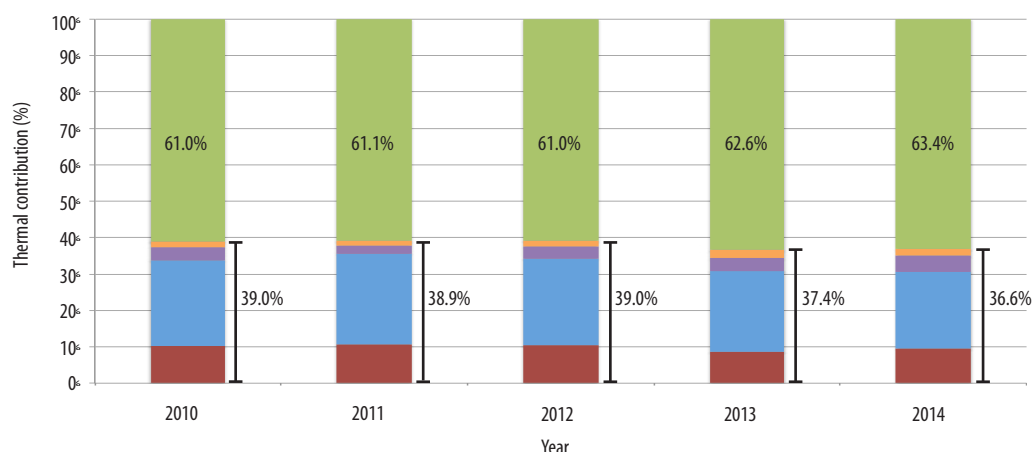
Outlook

The German government's *Annual Economic Report 2016*, published in January 2016, predicts that German GDP will grow by 1.7% in 2016, down from an earlier forecast of 1.8%. As of December 2015 the Bundesbank expected growth of 1.8% in 2016 and 1.7% in 2017. These figures suggest that the German construction sector will continue its recent solid performance in the next few years. An overdue need to make significant public investments in infrastructure could provide an additional boost for construction firms and cement producers. Such investment and investment in new housing projects may now be more likely, given that Germany took in around 1 million refugees and other migrants in 2015. 

	Consumption ('000t/yr)	Energy (MJ/kg)
Waste tyres	217	28
Waste oil	52	26
Pulp, paper and cardboard	92	5
Plastics	665	23
Other industrial waste	1138	21
Meat and bone meal	151	18
Municipal solid waste	308	16
Waste wood	3	13
Waste solvents	96	23
Sewage sludge	348	3
Oil sludge and organic residues	60	11

Right - Figure 4: Breakdown of fuel sources used in German cement industry by thermal contribution (%), 2010-2014. **Source:** The VDZ.

Coal
Lignite
Petcoke
Other fossil fuels
Alternative fuels



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Interview by Peter Edwards, Global Cement Magazine

Achinsky Cement: A leading force in Siberia

BaselCement, part of parent company Basic Element, was founded in 2006 and is now one of Russia's leading construction materials companies. BaselCement produces cement, lime, aerated concrete, breakstone and powdered minerals from six plants across Russia. *Global Cement* recently spoke to Vladimir Kolychev, Plant Director of Achinsky Cement, about aspects of the Siberian plant's rich history, its markets and the unusual production process that it uses.

Global Cement (GC): Can you explain the history of cement production at the Achinsky Cement site?

Vladimir Kolychev, Plant Director (VK): The Achinsky Cement plant was built in 1965 with two lines supplied by the French company Fives Lille Caille. At that time, the production lines consisted of five double-chamber raw mills ($\varnothing = 3.2\text{m}$, $L = 14\text{m}$), two wet process kilns ($\varnothing = 5\text{m}$, $L = 185\text{m}$) and five double-chamber cement mills ($\varnothing = 3.2\text{m}$, $L = 14\text{m}$). As the process developed, the kilns were increased to 5.6m in diameter.

Later on new Russian-made Volgocem mash lines were put into operation. This included wholesale changes to the material preparation, clinker burning and cement grinding sections of the plant. It included three new raw mills ($\varnothing = 4\text{m}$, $L = 13.5\text{m}$), three wet rotary kilns ($\varnothing = 5\text{-}5.6\text{m}$, $L = 185\text{m}$) and five cement mills ($\varnothing = 4\text{m}$, $L = 13.5\text{m}$).

The plant was initially intended to use belite sludge, but during the first few years it used a classic

scheme while construction of the adjacent Achinsky Alumina Plant. was still in progress. The plant adopted a unique technology that uses belite (nepheline) sludge as a raw material. It is sourced from the chemical hydrology department of the adjacent factory.

During the 1980 and 1990s the company implemented a new technology of using fluorite ore (CaF_2) as a mineraliser and lignite as a raw meal liquefier. To accommodate these new requirements, the Volgocem mash raw mills were converted to act as a primary raw meal grinding step, with a subsequent second step performed by the older Fives Lille Caille mills. In 1989 a nepheline sludge drying shop was put into operation and equipped with a mazut- (heavy fuel oil-) fired 1Mt/yr drying drum ($\varnothing = 4.6\text{m}$, $L = 5.6\text{m}$).

Improvement to the raw meal preparation in the late 1980s and early 1990s, as well as stabilising fuel burning and clinker formation in the kilns enabled improvements to the quality of the cement and achievement of M500-M550 quality, which correspond to European marks CEM I 42.5N and CEM I 42.5B respectively.

Following the end of the USSR and the formation of the Russian Federation, construction rates plunged and cement demand dropped to rock bottom. By 2001 the plant was declared unprofitable and was mothballed.

At the end of 2006, BaselCement holding was founded. It took hold of Achinsky Cement as one of its first assets. US\$13m was invested to restore the plant. The first renewed 0.7Mt/yr line was launched in August 2007. With a second, the capacity of Achinsky Cement site is now 1.4Mt/yr.

The revamp included new modern equipment and overhaul of the entire production process. Special attention was paid to production automation and environment aspects, kilns, electrical precipitators and cement mill bag filters in particular.

The use of mazut as kiln fuel was as-

Below: View of one of the kilns at Achinsky Cement.





Profile: Vladimir Kolychev

Vladimir Kolychev has worked at Achinsky Cement since 2008. He was promoted to the position of CEO on 1 July 2015, having previously been Production Director. Born in 1973, Kolychev studied non-ferrous metals and gold in Krasnoyarsk and attended the LINK International management institute in Moscow and Higher Business School of Lomonosov Moscow State University. Prior to Achinsky Cement, Kolychev worked at RUSAL Global Management BV in Achinsk.



sumed in the economic strategy of the plant because the market prices at that time allowed us to carry through high fuel prices to the cost of the cement. This solution was temporary and a new facility to produce a pulverised coal had been planned. However, due to the deterioration of the global economic environment in 2009, the 2-3 year construction period and US\$40m cost, the project had to be suspended.

Nevertheless, the plant's specialists came up with a more cost-effective option to prepare pulverised coal. The project was based on conversion of one of the cement mills to produce pulverised coal. Its capacity is about 60t/hr of dry fuel, which covers the fuel demand of the two cement production chains. It could potentially incorporate a third production line, should that also be restarted.

The project was implemented in two stages. The first temporarily converted a cement mill to coal grinding and drying using equipment that was already available on site. This required: Renovation and replacement of main parts and joints of the mill; Construction of a raw coal supply duct; Purchase and installation of a gas generator; Installation of an intermediate hopper for dry coal and installation of dry coal transportation duct. The capacity of the coal grinding plant at that stage was 20-40t/hr of dry

“Nepheline sludge is capable of increasing kiln capacity by 30% and can reduce fuel consumption by 25%”



coal, in order to test the methodology and quality of the product.

The aim of the second stage of the project was to reach the installed capacity of 60t/hr of dry coal. This included: Renovation of the raw coal feeding duct and installation of an intermediate hopper; Installation of production equipment according to design documentation; Installation and connection to the production line; Renovation of the building to meet fire safety requirements and; Installation of a firefighting system.

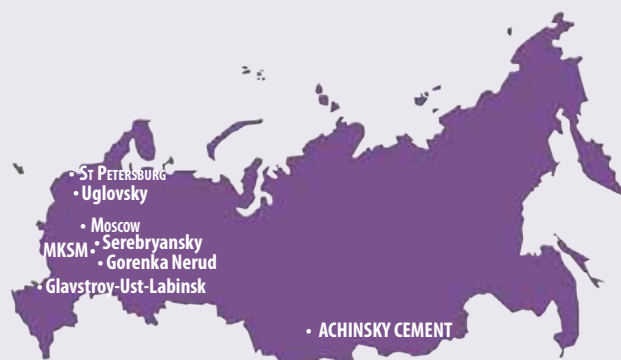
The efficiency of Achinsky Cement's in-house pulverised coal production solution was proved by consulting with research institutes and studying the experience of other companies.

The main effect of using coal as the main fuel has been a more than 30% cost reduction relative to mazut. This enabled improved competitiveness, even against the dry plants that are in operation today.



Plant profile: Achinsky Cement

Started production: 1965
Re-vamped in: 2007
Kilns: 2 wet - Volgocemmach
Total cement production capacity: 1.4Mt/yr



Company profile: BaselCement

Parent company: Basic Element
Founded: 2006
Other plants: Serbryansky (cement), Ryazan
Uglovsky (lime), Novgorod
Glavstroy-Ust-Labinsk (aerated concrete), Krasnodar
MKSM (mineral flour and breakstone), Ryazan
Gorenka Nerud (mineral flour and breakstone), Ryazan
Total cement production capacity: 3.2Mt/yr
Total lime production capacity: 260,000t/yr
Cement market share: 10% in central Russia, 13% in Siberia



A note on nepheline

Complex processing of nepheline rocks was invented by soviet scientists in the first half of the 20th century and was first implemented by a plant near St Petersburg. The second plant to use this technology was Achinsky Cement, with nepheline sourced from the Kia-Shaltyrskoe deposit.

By processing nepheline concentrate, the Achinsky plants (and neighbouring Achinsky Alumina Plant) produce a whole range of products. Apart from Portland cement, these include alumina (Al_2O_3), caustic ash (Na_2CO_3) and potassium carbonate (K_2CO_3).

GC: Could you provide a run-down of the production process used at the plant today?

VK: The plant currently uses two Volgocem-mash double-chamber tube raw mills ($\varnothing = 4.0\text{m}$, $L = 13.5\text{m}$), which have a capacity of $973,000\text{m}^3/\text{yr}$ of raw meal, two Volgocem-mash kilns that are rated at $0.667\text{Mt}/\text{yr}$ each and three Volgocem-mash cement mills. The internals and QDK 143-Z classifier of one of the finish mills were supplied by Christian Pfeiffer of Germany. The capacity of each is $0.7\text{Mt}/\text{yr}$.

The coal mill ($\varnothing = 4.0\text{m}$, $L = 13.5\text{m}$) has an SPTsV 4750/1600 classifier / separator and Italian HP JS1 \times 1-44X16-5.5 60t/hr bag filter.

The plant uses nepheline (belite) sludge as a raw material from the neighbouring Achinsky Alumina Plant. A co-product of alumina production, it mainly consists of dicalcium silicate $2\text{CaO}\cdot\text{SiO}_2$ (C_2S). It can almost completely substitute for clay and 50% of the limestone in the raw meal blend for the production of Portland-cement clinker. Nepheline sludge is capable of increasing kiln capacity by 30% and can reduce

fuel consumption by 25% compared to conventional raw materials.

As well as the nepheline sludge, the plant uses limestone and red clay from the Mazulsky limestone quarry. This quarry also belongs to Basic Element and is only 3km away from the production site. The raw materials undergo joint wet grinding and blending in the ball tube mills.

Ground raw meal is then homogenised in a total of six 1700m^3 vertical pools. Six are for homogenisation, two for unloading and one is for argillaceous pulp. Material then travels to the kilns, which have already been described. The coolers are Russian-made Volga-125 type grate coolers.

The clinker from the coolers is taken to eight reinforced-concrete silos with the total capacity of 20,000t and then to the cement mills. Through a pneumatic transportation system cement is then conveyed to finished cement silos. There are a total of 17 silos that we use today and a total cement storage capacity of 75,000t.

An automated system of production management and Delta V software module from US-based Emerson Electric provide online monitoring of the most significant parameters. These can be changed from

Right: View of the coal mill.



the control room.

Right: A limestone weighing conveyor system supplied by Sinetic.



GC: When did the plant last halt for maintenance and what work was conducted?

VK: Annual scheduled maintenance work is carried out during the seasonal demand reduction, between January and April. The maintenance is gradual and involves main and auxiliary equipment of both cement production lines of the site.

Looking back over previous stoppages, a number of the projects that we have implemented in recent years were aimed at product cost reduction. For example, converting the raw



meal pump to frequency steering and the elimination of a reciprocating control device from the raw meal feed allowed for a 1.3% reduction in raw meal moisture content that led to a 2% fuel saving. Another project involving a cooler grate drive conversion to frequency-controlled motors enabled an 8% saving of electrical power in the cooler.

Conversion of one of the cement mills to a closed circuit in 2015, as well as installation of additional equipment from Christian Pfeiffer GmbH and the introduction of automatic process controls, has contributed to growth in the amount of high-grade cement (CEM I 42.5N, CEM I 42.5B) produced at the

of monitoring the emissions of controlled sources that have been measured using specialised equipment. It is also worth mentioning our quality control laboratory at this point. It controls the quality of raw materials, fuel and finished products.

GC: Will there be any changes to the emissions controls or limits coming in the near future?

VK: In 2017 we plan to introduce automated monitoring systems for gas emissions to carry out a constant control of the emission sources that contribute most to air pollution.



Left: Rail transport is important for Achinsky Cement, especially for delivery of its coal.

plant to 0.5Mt/yr. This is 35% of capacity.

GC: Are there any planned changes to the production process in the pipeline?

VK: A number of measures are being taken during 2016 to optimise shipments and increase the bagged cement sales. If cement demand grows, we have plans to expand our production to 2.1Mt by bringing the third 0.7Mt/yr production line back on stream.

Fuels and the environment

GC: What fuels are currently used at the plant?

VK: The fuel is 100% hard coal from the Kuznetzsky basin, located around 3300km from the plant. We have no intention to change the fuel regime at the moment.

GC: What abatement and monitoring systems does the plant have?

VK: A special device is used to collect sludge dust from the kiln waste gases. The plant consists of a dust chamber and two UG type electrostatic precipitators.

The dust from the clinker cooler is recovered by eight groups of type CN 24 cyclones and a UG type electrical precipitator. The purification rate is 99.6%.

To collect dust from stationary sources (cement mills in the clinker grinding shop) special gas cleaning plants are installed and equipped with bag filters. A specially-authorised laboratory is in charge

Distribution and customers

GC: What geographical area is covered by the plant and how does it distribute its cement?

VK: The sales market of Achinsky Cement includes all regions of Siberia. To meet the requirements of our principal customers here, the company has refocused its sales over the past three years and reduced sales to other regions from 25% to 10%. Nowadays around 90% of our entire output is sold within Siberia. The rest is distributed in Urals Federal District, as well as the Khanty-Mansiysk and Yamal-Nenets Federal Districts, mainly in big-bags.

Cement is mostly sold ex-works. About 60% is delivered in railway wagons, which are weighed by scales from Mettler Toledo. Bulk cement is loaded into hopper wagons and cement in 1t big-bags are loaded into open wagons. Cement is also delivered by cement trucks in bulk or packed in 1t big bags and regular 50kg bags. For one of our principal customers (Norilsky Nikel) cement is packed in 14t containers.

For our customers' convenience, we have a transshipment station in Krasnoyarsk city where bulk CEM I 32.5B and CEM I 42.5N is loaded and dispatched by bulk tankers. This helps save much time when delivering cement to construction sites and other projects in the city.

C2: What type of company is the Achinsky plant's main customer?



Right: Inside the central control room.



VK: Our main consumers are producers of grouts and concretes, who take around half of our output. Then we have reinforced concrete plants, which consume around 20%, construction companies and dry mixture producers at another 20%. The remaining 10% is sold to local traders and retail consumers.

GC: Is the plant seeing any changes in terms of its customer profile with time?

VK: As the popularity of residential and industrial monolithic construction has increased, the number of consumer concrete producers has grown. At the same time, there has been a reduction in large-scale reinforced concrete plants, while independent producers with typical demands of 1500-2000t/month, have increased in number.

GC: Are you seeing a change in proportions of bulk / bagged cement with time?

VK: In 2016 the plant has planned a number of measures to increase the share of packed cement. The deliveries will be arranged to the nearby regions of Novosibirsk and Tomsk, as well as the Republic of Khakassia.

Markets and the future

GC: How is the plant being affected by the current economic downturn and low oil price in Russia?

VK: The economic recession has certainly influenced the construction sector. Most building companies have seen reduced residential contracts and cement consumption dropped by 12% year-on-year in Russia in 2015.

The decline in Siberian cement consumption in 2015 was actually worse, at 16.5% year-on-year. The production and sales from Achinsky Cement dropped by 15%. However, the company fared better than some of its competitors in 2015. We were able to increase our market share to 11.2%. Clinker sales were also up. With clinker taken into account the company's share in Siberia actu-

ally increased to 13% in 2015.

This has been down to a strategy of product quality improvement, expansion of a product line and close cooperation with customers. In 2015 a new mill with dynamic separator was put into operation and reached its installed capacity, which helped increase production of CEM I 42.5N and CEM I 42.5B to 20% of our total production.

GC: What do you think will happen to the market in the next year to five years?

VK: According to forecasts, the market in 2016 will decline by another 10-15% compared to 2015. Despite that, we are going to increase production of popular cement types in 2016 and increase the share CEM I 42.5N and CEM I 42.5B to 30-40% of the whole production volume. This is not only to retain our Siberian market share but also increase it, in the event that the decline is less severe than we expect.

It's really hard to make any forecasts for the next 3-5 years, since there are lots of external and internal factors. However, we hope that by 2018 the situation will change for the better and construction will recover and start to grow. We will be ready for the upturn, when it comes.

GC: What are the most important factors that will help the plant in the coming years?

VK: One of the key factors for the recovery of the Siberian cement industry is recovery in the construction sector. First and foremost, this means residential construction. This in turn requires mortgage improvement, reduction of bank rates and increased availability of loans.

Another factor is the development of large-scale infrastructure projects, for example, by Power of Siberia, the Baikal-Amur Mainline 2 railway project and others.

GC: Thank you very much for your time.

VK: My pleasure!



Right: Inside the plant laboratory.



USA: Titan to cancel construction of Castle Hayne cement plant

Titan America has cancelled the construction of a cement plant in Castle Hayne, North Carolina. It said it made the decision on economic reasons. Supply and demand balances in the specific regional markets did not support the cost of building a plant.

"Our decision to suspend construction on the cement plant in Castle Hayne is driven by basic project economics," said Bill Zarkalis, Titan America's CEO. "The pace of demand growth in the specific markets does not seem adequate to justify the addition of substantial new production capacity - more so because the costs to construct a new cement plant in the United States have risen substantially in the past few years. Finally, the overall risk profile of the project has worsened as new coastal capacity in North Carolina could be vulnerable to cement imports, considering the strong US Dollar, the global cement supply situation and low ocean freight costs." He added that Titan is committed to long-term growth in the US and that the group is investing over US\$250m between 2014 and 2016.

Titan America serves its North Carolina market from its Roanoke cement plant in Virginia, with an integrated logistics network of cement distribution terminals, warehouses and more than twenty ready-mix concrete plants. No jobs in any of Titan America's existing operations are expected to be affected by the decision to cancel the Castle Hayne cement plant.

Venezuela: New upgrade at Aragua

President Nicolas Maduro has dedicated a new cement production line at the Invecem cement plant in San Sebastian de los Reyes, Aragua. The project has cost US\$168m and is part of an agreement between China and Venezuela to build 2.1Mt/yr in production capacity.

USA: Lehigh orders cement mill upgrade

The Lehigh Southwest Cement Company has ordered a cement mill upgrade from FLSmidth for its Tehachapi cement plant in California. The upgrade is planned to increase cement-grinding capacity at the plant by 23% by installing and using the hydraulic roller press for pre-grinding.

The scope of contract for the EPC project including engineering, a new clinker bin, heavy duty roller press HRP-C 1.25 with its auxiliaries, weigh feeder, set of belt conveyors, nuisance filters, bucket elevators and new electrical room for this circuit. The project will use the new FLSmidth Tribomax wear surface. H&M Construction will provide civil/structural engineering and construction, working for FLSmidth. This will be the first roller press supplied in North America for FLSmidth in the last two decades.

"Our customers want high utilisation rates and minimum downtime. Wear parts are one of the key components when it comes to reducing overall maintenance cost and wear solutions like Tribomax reduce the total cost of ownership of the equipment considerably," said FLSmidth EVP Per Mejnert Kristensen.

Deliveries for the project will begin in the third quarter of 2016 and the roller press is expected to be in operation by April 2017.

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Brazil/World: InterCement makes Euro43.7m loss in 2015

InterCement made a loss of Euro43.7m in 2015. In 2014 it made a profit of Euro50.1m. Its revenue fell by 4% to Euro2.49bn from Euro2.6bn. It attributed the loss to an economic downturn in Brazil and unfavourable exchange rates. "This was undoubtedly a challenging year for InterCement, particularly due to the macroeconomic situation in Brazil, which accounts for about 35% of the cement production, the largest contribution within the company. The scenario was even more complex, as coupled with the economic downturn in the largest market where it operates, InterCement faced average unfavourable exchange rates," said CEO Ricardo Fonseca de Mendonça Lima in a statement.

He added that the company's decrease in EBITDA margin remained high in the international cement market at 20.8%. EBITDA fell by 18.2% to Euro518m in 2015. The cement producer reported that overall cement and clinker sales fell by 6.1% to 28.1Mt in 2015 from 30Mt in 2014.

By region, InterCement has temporarily suspended its grinding plants at Jacarei and Suape and its clinker kiln at João Pessoa in Brazil to cut costs. By contrast its plants in Argentina were working at full capacity in 2016. Co-processing developments were noted in Egypt and Portugal. The Alhandra cement plant in Portugal was the first unit in the company to beat a 50% co-processing monthly rate. A production decline was reported in Cape Verde and operational difficulties in Mozambique led to a kiln stoppage.

Colombia: Cementos Argos to contribute 10% of Colombian energy savings goal

Cementos Argos has launched energy saving measures that could contribute close to 10% of the energy saving goals of the Colombian national government. The cement producer has joined the energy savings campaign promoted by the government by taking additional measures at its plants and offices that can help conserve this important resource.

Cementos Argos intends to deliver excess energy from its self-generation plants of about 30MW to the domestic electrical network and limit the use of its 16 cement mills during peak hours, which will represent savings of about 38MW. In addition it will maximise its use of flexitime and day work to limit the use of electrical energy at its administrative offices. With these measures the company hopes to save the equivalent of the consumption of close to 100,000 homes per day and of close to 130,000 homes during peak hours.

"We are convinced that by joining our efforts, we can multiply results. That is why, if all companies and families put their best foot forward, we can all contribute to energy saving and create habits that allow us to preserve resources that are fundamental to our planet's sustainability," said Jorge Mario Velásquez, CEO of Cementos Argos.

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China: Shanshui warns of loss

Shanshui Cement has issued a profit warning, predicting a significant loss in 2015 compared to 2014. It has blamed the impending financial result on poor market demand for cement, industry production overcapacity and management distractions with legal proceedings the company has undertaken concerning the company and its subsidiaries.

In late January 2016 Shanshui Cement defaulted on a US\$270m bond. The default followed a battle for control of the company between Tianrui Cement, its biggest shareholder, and the Zhang family, its second-largest shareholder and former owners.

Uzbekistan: Kyzylkum for sale

Uzbekistan has put on sale state shares in Kyzylkumcement. According to the State Committee of the Republic of Uzbekistan for Privatisation, Demonopolisation and Development of Competition, the government wants to sell a 35.9% state shares or 160,658,567 shares in Kyzylkumcement for a total of over US\$160m. Sales of the state-owned cement producer will be handled by the block-trading section of Uzbekistan Stock Exchange.

Kyzylkumcement was launched in 1977. It is the largest cement plant in Uzbekistan with a production capacity of 3.1Mt/yr.

Philippines: Cemex Philippines prepares to sell minority stake

Cemex Philippines has started proceedings to sell a minority stake in its assets, filing a registration statement with the Securities and Exchange Commission (SEC) of the Philippines and the Philippine Stock Exchange. Subject to obtaining approvals from both bodies it will then sell a minority interest in the company's cement manufacturing assets in the Philippines, comprising two integrated cement plants; Solid Cement Plant in Rizal and the APO Cement Plant in Cebu. The decision to sell shares of assets in the Philippines is part of Cemex's wider asset divestiture plant (see article, right).

India: Ganguly to sell cement

Burnpur Cement has signed former Indian cricket captain Saurabh Ganguly as a brand ambassador for three years from 11 March 2016, to endorse the product and brand and to help increase of sales.

Pakistan: EPA defers approval for tyre-derived fuel plant at Bestway Cement

The Khyber-Pakhtunkhwa Environmental Protection Agency (EPA) has deferred the approval for setting up a tyre-derived fuel (TDF) plant at the Bestway Cement plant in Farooqia. The decision has been left by the EPA to consent from the local community, according to local press.

EPA Director General Dr Bashir Khan said at a public meeting that unless local residents were satisfied, Bestway Cement would not be issued a no-objection certificate. Residents have cited dust, smoke, noise and water pollution as reasons to object against the proposed plant. Qamar Hayat, a local activist, said that locals would allow the EPA to approve the TDF plant when they were guaranteed pollution would be monitored and that health hazards and property losses would be checked.

Pakistan: Emami to build US\$70m grinding plant

Emami Cement plan to build a 2Mt/yr cement grinding plant costing US\$70m for commissioning by the end of 2016. The foundation stone for the plant in Panagarh, West Bengal was laid by Chief Minister Mamata Banerjee in Panagarh on 26 February 2016.

"The 2Mt/yr capacity unit is to be located at the West Bengal Industrial Development Corporation Panagarh Industrial Park in Burdwan district of West Bengal at an investment of US\$70m," Emami Cement said in a statement.

Emami Group is currently also setting up a 4Mt/yr integrated cement plant at a cost of US\$439m at Risda, Chhattisgarh. The project is expected to become operational soon. Raw material will be sourced from the company's captive limestone mines in Chhattisgarh. Emami is also considering building cement plants in Rajasthan and Andhra Pradesh.

India: UltraTech Cement buys Jaiprakash Associates cement portfolio for US\$2.41bn

UltraTech Cement has signed a Memorandum of Understanding to buy Jaiprakash Associates' cement plants, which have a total cement production capacity of 22.4Mt/yr. The deal includes both integrated cement plants and cement grinding plants. The plants are situated in Madhya Pradesh, Uttar Pradesh, Himachal Pradesh, Uttarakhand, Andhra Pradesh and Karnataka.

The acquisition also includes a 4Mt/yr cement grinding plant being built in Uttar Pradesh. UltraTech will pay an additional US\$68.7m for this plant once it is completed. The deal will increase UltraTech's total cement production capacity to 90.7Mt/yr from 68.3Mt/yr. The transaction is subject to regulatory approval.

Asia: Cemex sells operations in Bangladesh and Thailand to Siam City Cement

Cemex has signed an agreement for the sale of its operations in Bangladesh and Thailand to Siam City Cement for US\$53m. The proceeds obtained from this transaction will be used mainly for debt reduction and for general corporate purposes. The deal is expected to be finalised in the second quarter of 2016 subject to regulatory approval. Cemex runs a 0.8Mt/yr integrated cement plant in Saraburi, Thailand. The plant was originally purchased from Saraburi Cement for US\$77m in 2001. Cemex operates a 0.52Mt/yr cement grinding plant in Madangonj, Bangladesh.

Philippines: Holcim Philippines profit rises by 58% to US\$171m

Holcim Philippines has reported a rise in net profit of 58% year-on-year to US\$171m in 2015. Its revenue rose by 15% to US\$793m. It attributed the gain to increased government spending in infrastructure projects and higher construction activity. Profits also benefited from a US\$55m gain from the revaluation of an investment in an affiliate. The LafargeHolcim subsidiary also reported that it is increasing its cement production capacity to 10Mt in 2016 from 8Mt in 2015 to benefit from anticipated infrastructure spending.

Australia: Adelaide Brighton profit rises by 20% to US\$150m

Adelaide Brighton has reported that its net profit rose by 20% to US\$150m in 2015 from US\$124m in 2014. Its revenue grew by 5.6% to US\$1.02bn from US\$964m. The construction materials company attributed the growth to 'healthy' residential construction in east coast markets.

"Cement and clinker sales volumes increased marginally in 2015. Strong demand in New South Wales, Victoria and south east Queensland, was primarily driven by residential construction. This demand more than offset the previously anticipated reduced sales to a major South Australian customer and lower sales to resource projects in Western Australia and the Northern Territory," said the company in a statement.

It added that import volumes continued to grow in 2015 as Adelaide Brighton used imports to meet domestic demand, whilst reducing local manufacturing capacity in Western Australia. The company made savings of US\$7.2m in 2015 by stopping clinker production at its Munster plant.

Vietnam: No to Ha Long shipments

The People's Committee of Quang Ninh has decided to stop the loading, discharge and transport of clinker and cement on Ha Long Bay due to pollution fears. Under decision No. 617/QD-UBND, transportation of bulk cargo, such as clinker and cement will be terminated from 1 July 2016. Transportation of these goods will be moved to Hon Net port on Bai Tu Long bay instead. The committee has also previously proposed that the government stop upgrades at two cement plants, Thang Long 2 and Ha Long, due to similar concerns.

Ha Long Bay, which spans 1553km² and houses 1969 islands of various sizes, was recognised as a UNESCO World Heritage Site in 1994 and 2000, and already has 2000 tourist boats plying their trade.

New Zealand: Holcim New Zealand opens 30,000t Timaru cement terminal

Holcim Zealand has officially opened its 30,000t cement terminal at Timaru port. Economic Development Minister Steven Joyce and Rangitata MP Jo Goodhew attended the opening. The US\$34m project is intended to serve South Island and lower North Island, according to local press.

The terminal has unloaded two ships since December 2015. The cement producer aims for 18 inbound ships a year to Timaru, with the Holcim-owned Milburn Carrier II shipping outbound orders from its berth at the reconstructed No 2 wharf. Another cement terminal is being built in Auckland and is planned for opening in mid-2016.

Azerbaijan: Azerbaijan Investment Company sells 10% stake in Holcim Azerbaijan

The Azerbaijan Investment Company (AIC) sold its 10% stake in Holcim Azerbaijan to Holcim on 18 November 2015, according to a government source quoted by Azer-Press. AIC and Holcim signed a memorandum of understanding in December 2007 allowing AIC to gain 10% of shares in local Holcim cement plant following the completion of certain conditions. These included increasing the plants cement production capacity from 1.3Mt/yr to 1.7Mt/yr of cement and its clinker production capacity from 0.8Mt/yr to 1.2Mt/yr of clinker.

China: Semen Indonesia net profit drops by 18.7% to US\$337m in 2015

Semen Indonesia has reported that its net profit fell by 18.7% year-on-year to US\$337m in 2015 from US\$415m in 2014. Its revenue fell slightly to US\$2.01bn. The cement producer's director Suparni attributed the fall in net profits to an increase in electricity and distribution costs, as well as the depreciation of the rupiah against the US Dollar.

Semen Indonesia plans to increase exports in 2016 in order to counteract falls in sales in the domestic market, according to local press. The company expects to begin operations at two new cement plants, Indarung VI in West Sumatra and Rembang in Central Java, in the third quarter of 2016. The two cement plants will have production capacities of 3Mt/yr each.

Vietnam: Companies fail to build WHR systems

Only four cement producers have built waste heat recovery (WHR) systems by the end of 2015 despite a request by the Prime Minister Nguyen Tan Dung. Holcim, Chinfon, Ha Tien and Cong Thanh are the only companies to have built the upgrades. The delay has been blamed on the high cost of implementing WHR systems and the market's poor sales.

According to Nguyen Hoang Cau, secretary general of the Vietnam Cement Association, there are more than 40 cement production lines in the country subject to the requirement. These also include foreign cement producers such as Taiwanese-backed Phuc Son Cement, Hong Kong's Luks Cement Vietnam Limited, and Japanese-funded Nghi Son Cement. Cement producers have complained to local press about their inability to build WHR systems without financial help.



China: MIIT considers guidelines on eliminating outdated cement capacity

The Ministry of Industry and Information Technology (MIIT) and related departments are considering draft guidelines on eliminating outdated production capacity in cement, ship-making, electrolytic aluminium and glass industries, according to Xinhua. At least 500Mt of 'low-grade' cement production capacity will be phased out.

The central government decided to promote supply-side reform at the end of 2015. Eliminating outdated capacity is a top priority. Methods to do this include phasing out

outdated capacity, removing 'zombie' enterprises and promoting industrial reorganisation.

Kong Xiangzhong, vice president of China Cement Association, has advised the central government to provide certain compensation for the industry and establish a special fund so as to appropriately deal with the re-employment of redundant personnel and enterprise debts. Several provinces have specified their targets. Guangdong Province plans to cut clinker production capacity to 110Mt by the end of 2018.

Philippines: Cement shortage hits Pangasinan Province

A shortage of cement has been reported in the Pangasinan province due to government projects, including road widening schemes, and private construction. The local Northern Cement Corp. (NCC) plant at Sison is producing around 100,000 bags per day according to the Philippines News Agency. Despite this, dealers and buyers are reporting cement shipments selling out hours after delivery, with prices spiking accordingly.

Department of Trade and Industry (DTI) monitoring of the NCC plant reports that 2.2 million bags were delivered by NCC in January 2016 and 1.9 million bags were delivered from 1 – 22 February 2016. The NCC is upgrading its local plant to double production to 200,000 bags per day by mid-March 2016. The DTI has asked consumers not to panic over this 'temporary' shortage.

India: UltraTech to restructure deal if mining law amendment not approved

UltraTech will create a separate corporate structure for the cement assets of Jaiprakash Associates it has agreed to buy if a key mining law is not amended by June 2016. An amendment to the Mines & Minerals (Development & Regulation) (MMDR) Act in 2015 suggested that the transfer of mining rights could only be passed by auction, leading to delays in several mergers and acquisitions in the cement industry.

If the MMDR Act amendment is not approved, Jaiprakash Associates will need to create a separate entity out of the

India: National Green Tribunal issues pollution notice to 13 cement companies

The National Green Tribunal has issued notices to 13 cement companies on a petition alleging that they are violating its orders and environmental norms as well as the provisions of the Motor Vehicles Act, 1988, by causing air pollution. The petitioner, Neena Pradeep, has also accused the cement companies of overloading their trucks with cement and clinkers in order to save toll tax, according to the Hindu. Violations by Shree Cement and JK Cement were highlighted during the hearing. They have allegedly overloaded their trucks by 200 - 250%.

India: Ajay Piramal linked to Lafarge India

Ajay Piramal, the Indian businessman and chairman of Piramal, has started talks with Lafarge India to buy its assets, according to sources quoted by the Economic Times. Speculation has followed Piramal since he sold his pharmaceuticals business for US\$3.8bn in 2010. If completed, the move would mark a diversification from Piramal's healthcare, financial services and information management businesses.

Piramal and Lafarge India separately declined to comment on the issue. Lafarge India is selling all of its assets in India including a cement production capacity of 11Mt/yr.

assets being sold to UltraTech, for the deal to proceed. However, it will refinance Jaiprakash's borrowings at lower rates if the MMRDA amendments get approved.

UltraTech announced in late February 2016 that it was purchasing the majority of Jaiprakash Associates' 22.4Mt/yr cement portfolio instead for US\$2.4bn.

India: Shailendra Chouksey appointed president of Cement Manufacturers' Association

Shailendra Chouksey, a director of JK Lakshmi Cement, has been appointed as the new president of the Cement Manufacturers' Association (CMA) for a two year term. He replaces OP Puranmalka, the managing director of Ultratech Cement. Previously Chouksey was the vice-president of the association.

"As the newly elected president of the CMA, my priority

is to devise methods to work with different stakeholders, including the government of India to spur the cement demand," said Chouksey.

Chouksey holds a PhD in managerial economics, an MBA in marketing from the Faculty of Management Studies, Delhi and a post-graduate degree in physics. He has worked in the cement industry for nearly 40 years.



Ghana: Ghana cement cap?

Ekwow Spio-Garbrah, the Minister of Trade and Industry, has proposed legislation to parliament to cap imports of cement into the country. Spio-Garbrah also announced that all cement importers must register with the ministry by 31 March 2016 to apply for a permit, according to the Daily Trust.

"The Ministry of Trade and Industry proposes through legislation to impose a ceiling on the annual importation of cement into Ghana. Companies that wish to import bagged cement shall be issued a permit to avoid the chaos that has lately saddled the sector," the ministry said in a statement. Companies legitimately licensed under the ECOWAS Trade Liberalisation Scheme will be exempt from applying for permits.

Ghana has a cement production capacity of 9Mt/yr but it only consumes 6Mt/yr giving it an excess of 3Mt/yr. However the country imports over 1Mt/yr of cement. Complaints about cement imports from Nigeria and China have been made in local press since the start of 2016.

South Africa: Chinese arrival

The South African Bureau of Standards (SABS) has confirmed that Longkou Fanlin Cement had been approved for sale in the country. However, the mandate is only part of the process the Chinese cement producer needs to secure to allow it to import cement into the country.

Thato Chabeli, spokesperson at SAB, confirmed that 'two schemes' for Longkou Fanlin Cement had been approved by the SABS. He added that the trade body had not received any other applications from Chinese cement producers. The SABS certifies cement as being compliant with the South African compulsory specification before it can be sold in the domestic market. However, Chabeli, added that the Chinese cement producer also needed to secure a letter of approval from the National Regulator for Compulsory Specifications (NRCS) before the company would be permitted to export its cement to South Africa.

Local cement producers have previously filed a dumping complaint with the International Trade Administration Commission (ITAC) about cement imported into South Africa from Pakistan. ITAC then imposed duties ranging between 14.29 - 77.15% on cement imported from Pakistan. Subsequently, cement imports to South African from Pakistan fell by 30% year-on-year.

Zambia: Lafarge Zambia revenue falls by 6% to US\$250,000 in 2015

Lafarge Zambia's revenue has fallen by 6% year-on-year to US\$250m in 2015 from US\$267m in 2014. Its profit fell by 24% to US\$62m from US\$82m. The subsidiary of LafargeHolcim blamed the results on challenging markets, power costs increase and steep currency depreciation.

"Despite new competition and challenging markets, Lafarge Zambia maintained its market leadership in 2015 both in Zambia and in the Democratic Republic of the Congo, with a marginal reduction versus our record 2014 volume numbers. The second half of 2015 saw a combination of negative factors both in terms of market and in terms of production costs," said Lafarge Zambia CEO Emmanuel Rigaux.

In 2016 the cement producer expects the market to be challenging for both price and volume. It intends to focus on exports markets in the Democratic Republic of the Congo, Malawi, Zimbabwe and Tanzania. A partnership with the rail authorities including Zambia Railways Limited is also expected to further aid exports.

Zimbabwe: Masiyane appointed MD at PPC Zim

Kelibone Masiyane has been appointed as the managing director of PPC Zimbabwe. He replaces Njombo Lekula, who recently became the managing director of PPC's international operations. Previous to the appointment, Masiyane's was the general manager of the Colleen Bawn and the Bulawayo cement plants.

"Kelibone's promotion will see him assume overall responsibility for PPC Zimbabwe's business, with his key focus our Harare factory," said Lekula. Other recent promotions include those of Iain Sheasby and Karen Mhazo to the roles of Commercial Director and General Manager of Finance respectively, and that of current Group Human Resources Manager designate Trust Mabaya in March 2016.

Egypt: Suez Cement denies Egyptian exit plans

Suez Cement has denied that it is planning to leave the Egyptian market. The announcement comes in response to media speculation following the cement producer's admission that it has been unable to repatriate profits of Euro50m from the country for about a year. Suez Cement is 55% owned by Italian cement producer Italcementi.

Suez Cement's Managing Director Bruno Carre blamed the problem on a foreign currency crisis in Egypt. The country's central bank has introduced measures to reduce non-essential imports to save hard currency. Subsequently, businesses are unable to access US Dollars for imports and goods are piling up at ports.

Algeria: Cement costs rise after plant shut-down

Cement production has resumed at the Société des Ciments Sour El-Ghozlane cement plant following maintenance work and an upgrade to add an electrostatic precipitator filter. The 1Mt/yr plant, a subsidiary of Buzzi Unicem, has been shut for nearly two months causing a shortage of cement in the central region of the country. This cement shortage has led to some construction projects stalling and the cost of cement rising, according to El Watan.



Rwanda: Cimerwa calls for lower imports

The management of Cimerwa has asked that the government prioritise locally-made cement, according to the New Times. Despite opening a new cement plant in mid-2015 and cutting its prices, the local producer has found it difficult to sell its product despite growth in the construction sector.

"We recognise that while the regional market is large enough for everybody, as local company, and as Rwandan consumers, we all have a duty to contribute to the economy by consuming locally-produced goods and services in order to reduce Rwanda's import bill and build local businesses," said Busisiwe Legodi, the chief executive officer of Cimerwa. The company is also considering setting up depots across Rwanda to further cut its prices.

Angola: Update on 2Mt/yr Nova Cimangola project

ATEC has released information regarding its work on the construction of a 2My/yr greenfield cement plant for Nova Cimangola.

As an engineering, procurement and construction management partner, the Austrian engineering company is supervising the 30 months construction period. The scope of supply includes: tender preparation and contract negotiation; technical services; civil, mechanical and electrical erection supervision; and supplier quality assurance. The plant will be finished by the start of 2017.

Kenya: EAPCC issues profit warning

East African Portland Cement (EAPCC) has issued a profit warning due to mounting losses caused by higher financing costs and currency market losses. Its loss for the half year that ended on 31 December 2015 grew to US\$5.22m from US\$0.64m in the same period in 2014. The cement producer also expects its profits for the 2015 – 2016 financial year, which ends on 30 June 2016, to fall by at least 25%.

EAPCC's financing costs rose by 50% to US\$2.74m, which it attributed to increased use of debt to finance capital projects, including the setting up of a third packing line to support higher sales volumes. Sales revenue rose by 12% year-on-year to US\$45.2m from US\$40m. Sales volumes rose by 16%.

Tanzania: Tanga in discussions to use Usambara Railway

Tanga Cement is in discussions with the Tanzanian government to increase its use of the Usambara Railway to transport its products to Arusha, according to Makame Mbarawa, the Minister for Works, Transport and Communication. Mbarawa made the comments to local press on a visit to Tanzania Railway facilities and a cement plant in Maweni.

Tanga Cement has pledged to use the railway line to transport 35,000t/month. The move is intended to minimise damage to the country's road network. In the 2014 – 2015 year Tanzania Railways transported 44,000t of cement. From July to December 2015 the railway transported 24,960t of cement, according to Masanja Kadogosa, the Deputy Director General of Tanzania Railways.

Kenya: Bamburi Cement profit rises by 46% to US\$83.5m in 2015

Bamburi Cement's pretax profit has risen by 46% year-on-year to US\$83.5m in 2015, according to Reuters. Its turnover rose by 9% to US\$386m. The rise in profit was attributed to higher sales, investment income and currency gains. "Turnover increased... driven by increased demand in the key domestic markets in Kenya and Uganda resulting mainly from growth in large infrastructure projects and contractor segments, despite some slow down in domestic market in the last quarter," said Bamburi in a statement.

Saudi Arabia: Mill trial starts

Eastern Province Cement has started the trial operation of its new cement mill, which is expected to continue for three months until mid-June 2016. Commercial operation of the new mill will begin in the second quarter of 2016, the company said in a bourse statement, although market demand for new supply is not yet assured.

Algeria: New 6000t/day plant for Orascom

Orascom Construction has signed a contract to build a 6000t/day greenfield cement plant in Algeria for an unnamed private sector client. The deal is part of a wider set of industrial and infrastructure projects worth US\$200m the engineering and construction contractor has announced in Algeria.

"These new construction contracts build on our substantial track record in Algeria that stretches across a number of sectors including power, water desalination, petrochemicals and cement," said Osama Bishai, CEO of Orascom Construction.

Nigeria/World: Dangote profits up in 2015

Dangote Cement has reported that its profit rose by 14% year-on-year to US\$910m in 2015 from US\$801m. Its revenue rose by 26% to US\$2.47bn from US\$1.97bn. Cement production volumes for the group rose by 35% to 18.9Mt in 2015 from 14Mt in 2014. Cement production capacity rose by 87% to 42.6Mt/yr from 22.8Mt/yr. Sale revenue in Nigeria rose by 5% to US\$1.95bn, while revenue in West & Central Africa rose by over five times to US\$212m from US\$31m. Dangote Group set up a 100% owned subsidiary for cement production in Nepal and two 90% owned subsidiaries for cement production in Zimbabwe in 2015.



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 more information from China, Uganda, Kenya, Malawi and Zambia.

US: The mean price of Portland and Masonry cement in the United States rose by US\$5/t in 2015 compared to 2014, according to www.statista.com. Prices were up from US\$100.50/t to US\$105.50/t.

Israel: Following a drop in the prices of raw materials for making cement, mainly oil prices, the Ministers of Finance and the Economy notified Nesher Israel Cement Enterprises that it must cut its cement prices by 5.35% on 28 February 2016. The revision was according to a procedure stipulated in an arrangement that Nesher signed in September 2014. The Ministry of Finance stated, "The cut in cement prices will contribute to a fall in the prices of inputs in the construction and infrastructure sectors, and we hope that it will be passed on throughout the entire economy."

Rwanda: Local producer Cimerwa, which launched its cement plant in August 2015, is retailing cement US\$12.26/bag (50kg). The retail price for Hima cement from Uganda is US\$12.41/bag. There are other cement brands, such as Kilimanjaro Cement, which costs US\$14.10/bag.

According to Busisiwe Legodi, Cimerwa's CEO, there are initiatives to encourage Rwandans to buy locally-produced cement to enhance its competitiveness in the market. However, despite all these customer-friendly initiatives, the cement-maker is finding difficulty to sell its products, the increasing demand for cement by the local construction and real estate sectors notwithstanding.

Egypt: Prices of Portland cement as at 8 March 2016. Arabian Cement = US\$89.14-92.33/t; Building Materials Industries Co = US\$86.84/t; ASEC Cement = US\$85.31-86.59/t; Lafarge Cement Egypt = US\$91.95/t; Medcom Aswan Cement = US\$85.57/t; Arish Cement = US\$85.95/t; Sinai Cement = US\$85.95/t; Suez Cement = US\$87.86/t; National Cement = US\$88.73/t; Portland Torah Cement = US\$88.73/t; Helwan Cement = US\$88.73/t; Misr Beni Suef

= US\$86.84/t; Swedi Cement = US\$91.95/t; South Valley Cement = US\$85.95/t; Misr Cement Qena = US\$85.57/t.

White cement prices as at 8 March 2016. Sinai White Cement = US\$155.81-160.91/t; El Menya Cement - Royal = US\$159.00/t; Menya Helwan Cement = US\$156.44/t. Blended cement prices as at 8 March 2016. National Cement Altawfir cement = US\$77.26/t; Helwan Alwaha cement = US\$79.18/t. Sulphate-resistant cement prices as at 8 March 2016. ASEC Cement Asec Sea Water cement = US\$90.67/t.

DRC: The average cement price in Kinshasa has fallen by 15% between the start of 2016 and the end of February 2016. The fall, to around US\$17.65/bag (50kg), is reportedly due to increased imports, particularly from China.

North Sudan: The price of one bagged metric tonne of OPC 42.5N ex-factory is US\$110 while the price of one metric tonne of local petcoke is US\$150 and of one tonne imported diesel oil is US\$380. Our correspondent says, "Local petcoke is showing shortages these days due to low oil production in north of Sudan while major field in recently independent South Sudan is stricken terribly by two years of civil war. Sudanese plants using petcoke (3 out of 6) are not so far affected by Khartoum refinery's low production of petcoke because of huge petcoke stocks built-up by these plants during their construction period."

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

FOB {+ the named port of origin} = Free On Board: The delivery of goods on board the vessel at the named port of origin (loading), at seller's expense. Buyer is responsible for the main carriage/freight, cargo insurance and other costs and risks.

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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A pace of change so slow that you can hardly see it - but it's there.

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



I've just return from a big exhibition called Ecobuild, which was all about the latest building materials and methods which inevitably focuses on low-CO₂, low embodied energy and low energy-in-use. It was an interesting day out and I was fascinated to see some of the latest trends on display, not all of which were expected.

Perhaps the most critical trend was actually an absence: there was no-one showing high specification low-CO₂ cement at the show. In previous years, at this show and at others, there would be a variety of companies showing off their low-energy, low CO₂ cement - I'm thinking of companies like Cenin, Ecocem, Lafarge, Italcementi and HeidelbergCement - based on mineralisers or fluxes, on altering the ratios between the main clinker mineral phases, through the use of alternative raw materials (including blast furnace slags and ashes) or even the adoption of novel mineral systems such as MgO, rather than the more familiar CaO-CaCO₃. This year there were no companies shouting about their cement products from the exhibition stands, but the importance of this is not yet clear. Have these novel approaches failed? Are the economics not yet right (particularly since the cost of CO₂ emissions is still very low)? Or are these products quietly taking their place among the everyday, humdrum cement products that everyone now takes for granted? I think that it is likely to be a mix of all three.

One positive trend that I detected was that of home energy storage. This first hit the headlines when Elon Musk of Tesla (and SpaceX and eBay etc) announced in May 2015 that he had an invention¹ that would change everything. What he announced was a lithium-ion battery that you could use to store energy at home (that announcement was rather 'Apple-esque' since this had been done before by other people, but he was proposing a slightly sexier way of doing it - like Apple announcing a smartwatch or a music player). Well, at Ecobuild, there were plenty of companies offering the same kind of devices, for solar and wind energy storage and even for storage energy taken from the grid when it is cheap and for use when it is expensive. This seems to me like a 'no-brainer': the cost of the devices is coming down fast and even though they have a limited series of charge cycles (about 4000, enough for 20 years' use), they will easily save their cost. Eventually, we will all have one.

The most novel departure from electrical home energy storage that I saw was a device that promises to store thermal energy - for example from a solar-thermal

array. The heated water is ducted into a unit which contains a banks of cells of a particular salt - the heat being used to 'melt' the crystalline salt into a liquid. When the heat stored in the unit is required again, a small initiating electric charge is used to cause the salt to crystallise again, at which point it exothermically gives up its energy of crystallisation to the circulating cold water, heating it up. Apparently the system is very efficient, offering another means of gaining benefit from the free energy around us.

Another trend at the show was that of the number of stands originating from China, but staffed with forlorn, uninterested-looking personnel. The companies attending from China seem to have goods to offer to the market, and presumably they have cost advantages that are used to gain an edge in selling price over their competitors, but their staff almost all remained on their stands, engrossed in their devices, ignoring the visitors and perhaps missing home. Companies in China are very, very keen to sell their products, since the bottom has dropped out of their home markets: the Chinese economy is in a parlous state: debt levels are at around US\$5.5tr (depending on how it is counted), and there are many ghost cities and zombie companies haunting the economy. If and when the loans that financed the ghost developments finally go bad, and when the companies are finally allowed to die, then we will have an economic hard landing in China that will rank alongside the US sub-prime disaster of 2007-2008 and which will make the current Chinese slowdown look like a walk in the park on a sunny spring day. No wonder they have sent their staff abroad to try and rustle-up some business. It's just a pity that the staff would seemingly prefer to be anywhere else.

The final trend of note, perhaps not perfectly new but certainly a new twist - for me at least - was that shown by Professor Cruz of University College London, the director of BiotA Lab. His stand (right) showed the results of a 3-D printing project ('*Ho hum*,' I hear you say), but one that uses a variety of novel composite mixes, including cement, gypsum, marble, sand and cork. Add slag and ash into that list and you have the potential to make some real high-specification, low-energy, low-CO₂ building materials. Watch this space - *this* is the future.



¹ <http://www.theguardian.com/technology/2015/may/01/tesla-announces-low-cost-solar-batteries-elon-musk>

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Alternative fuels, Environmental Technology, Wear, Slag

Plant report: Ash Grove Midlothian plant, Texas, USA

Interviews: James Toscas & Ed Sullivan, PCA

Country report: USA (with focus on Texas)

Event Preview: Hillhead 2016, Buxton, UK

Following issue: June 2016

Advertising deadline: 26 May 2016

Distribution: Hillhead 2016, Buxton, UK

Process Optimisation, Quarrying, Conveying, Dust Control

Alternative fuels, Loading and unloading

Bagging, Packing & Palletising

Plant report: TBC

Country report: United Kingdom

Event Review: IEEE-IAS/PCA Cement Conference, Dallas, USA

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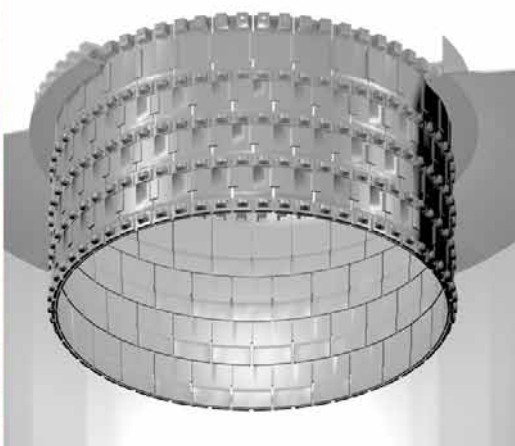


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