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JUNE 2017

Read more about KilnCooler on page 8

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This issue's front cover...

KIMA Echtzeitsysteme GmbH

For 20 years KIMA Echtzeitsysteme has been working in the field of high performance closed loop controls, innovative sensor systems and databases for processing industries. With SmartFill, KIMA 'E' sets new worldwide standards regarding the precision and reliability of measuring the fill level of ball mills. Based on its great results KIMA developed its predictive expert system MillMaster.

With the 'KilnCooler' another intelligent solution is provided. The treatment of heated spots on the kiln shell has shown in plenty of plants that unexpected kiln stops can be postponed. Read more about it in the article regarding kiln cooling, employing precise IR-controlled water evaporation, starting on Page 8 of this issue of *Global Cement Magazine*.

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Dear readers,

Welcome to the June 2017 issue of *Global Cement Magazine* - the world's most widely-read cement magazine - which will be distributed to all delegates at the first *Global CemTrans Conference & Exhibition*, taking place in Antwerp, Belgium on 6-7 June 2017. The conference will cover all aspects of cement and clinker transport and logistics 'from silo to site.' There is still time to register - Visit: *www.Cem-Trans.com*.

Looking at the global cement news in this issue, we see a number of first quarter results for 2017 from the major cement producers. The top three, LafargeHolcim, HeidelbergCement and Cemex reported broadly stagnant like-for-like sales volumes compared to the first quarter of 2016. However, differences in their real performances start to creep in when we look at sales revenues. LafargeHolcim and Cemex both reported sales revenue increases of 5–6% on a like-for-like basis, while HeidelbergCement reported no change. This is further backed up by operating earnings before interest, taxation, depreciation and amortisation (EBITDA) figures that rose significantly on a like-for-like basis for LafargeHolcim at 8.8%, more modestly at 2% for Cemex but fell by 3% for HeidelbergCement. In terms of actual cement volumes, the most dramatic change was at HeidelbergCement, as it absorbed Italcementi's assets. Cemex's output was almost identical year-on-year and LafargeHolcim's output was down by around 8Mt, due to continued asset sales. The continued sale of assets is part of 'lean-ness,' one of LafargeHolcim's four 'strategic pillars' presented in its 2016 Annual Report. Under the direction set by the outgoing CEO Eric Olsen, the company is set to become 'asset-light,' selling some of its excess capacity, almost completely eliminating greenfield projects, contracting out distribution and increasing vertical integration into areas like ready-mix concrete. The plan is sensible: spend less and make the best assets work harder. Of course, Olsen will not be at the helm to see the plan come to fruition. That will be left to Jan Jenisch, the current CEO of Switzerland's Sika AG, who will have to plan for future 'battles' against the rest of the global cement industry, including the newly-enlarged HeidelbergCement.

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

Peter Edwards
Editor

Cement Industry Suppliers' Forum

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Dirk Schmidt, KIMA Echtzeitsysteme

Keeping kiln shell temperatures under control

Increasing requirements relating to energy consumption, productivity, emissions and operational costs have led to a range of ways to optimise cement production. Here KIMA Echtzeitsysteme describes its KilnCooler system, which uses water to reduce the impact of hot spots on cement rotary kilns. When we speak about putting water on an, admittedly hot, rotary kiln, many people have concerns. These should be thrown overboard. A rainstorm will bring far more water onto the kiln than the system described below.

As the margins of cement producers become more squeezed, especially in developed markets, there is increased pressure on cement plant kilns. The dark side of this drive towards operational optimisation is an increased need for maintenance. Over the year maintenance teams have to keep the kiln running from one planned stoppage to the next, without unplanned halts.

In this context one parameter is becoming particularly difficult: keeping the kiln shell temperature under control and avoiding uneven temperature profiles / hot spots when looking at the entire circumference of a kiln section. In part due to the introduction of alternative fuels, kiln temperatures now vary more rapidly and with less predictability than in the past. Formerly less critical areas of the kiln shell can also heat up unexpectedly.

To help create even and predictable kiln shell temperature profiles, KIMA Echtzeitsysteme has developed the KilnCooler™, a water evaporation-based system for kiln shells. This idea often meets with the reaction that water should never be put on the kiln. This article will show that this assertion is incorrect. The system does not provide a miracle but it is very effective at cooling the kiln under certain conditions.

Introduction to the KilnCooler

When experienced kiln operators are asked which circumstances they think have the biggest influence on temperature increases within kiln shells, there are four main answers:

1. Increased use of alternative fuels, leading to higher wear on the refractory and widely varying coatings due to changing conditions;

2. Larger kilns with higher mechanical tension, which leads to higher kiln ovality and damage to the refractory lining;

3. Use of inappropriate refractories;

4. Uneven coatings.

As with so much else in the cement sector, the exact reasons for a critical temperature increase differ from kiln to kiln, plant to plant and country to country. However, the main possible effects are the same everywhere: Increasing shell temperatures can lead to hot spots and, often, the need to stop the kiln. This can take a kiln line down for a week or more.

When calculating the costs of the resulting production losses even under conservative assumptions, one can easily see the big commercial potential underlying the prevention of an unplanned emergency stop. Table 1 shows an example calculation for a 4000t/day kiln. The example does not take into account the additional costs that occur, for example the salaries of the people who have to take care of the unplanned kiln maintenance works, the costs of additional fuel needed for heating up the kiln again and other smaller costs.

This simple calculation already shows the steep increase in the cost of production loss when simply

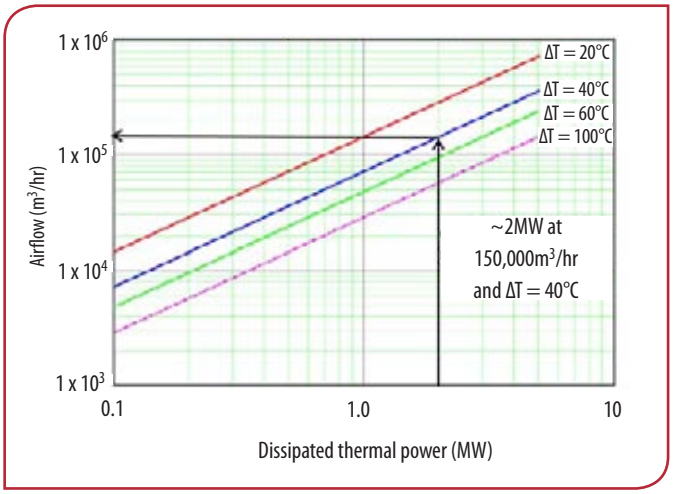
Right - Figure 1: KIMA E's water cooling system KilnCooler™ for kiln shells installed between the conventional air coolers on a rotary kiln in South Africa.

Parameter	Value
Kiln prodution rate	4000t/day
Sales price	US$77/t
Assumed sales margin	US$11/t
Minimum duration of kiln stop	6 days
Cost of production losses because of an emergency kiln stop	4000t/day x US$11/t x 6 days = US$264,000

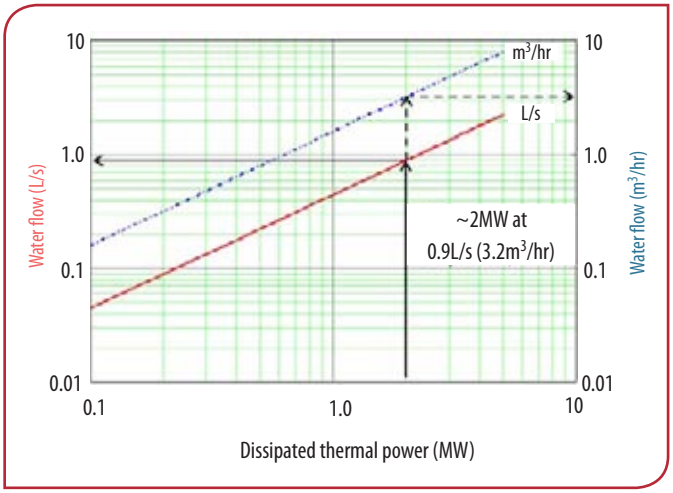
Right - Table 1: Example calculation of the costs of production loss due to an unplanned kiln stop, assuming two days for stop/cool down, two days to work on the refractories, one day for drying and one day for start-up.

Parameter	Value
Kiln length	60m
Kiln diameter	5m
Ambient temperature	22°C
Temperature difference by which the blower air can be heated up	40°C

Far left - Table 2: Assumptions for comparison calculation of air versus water.



Left - Figure 2: Cooling power due to air blower capacity at kiln shell.



Left - Figure 3: Cooling power by evaporation of water.

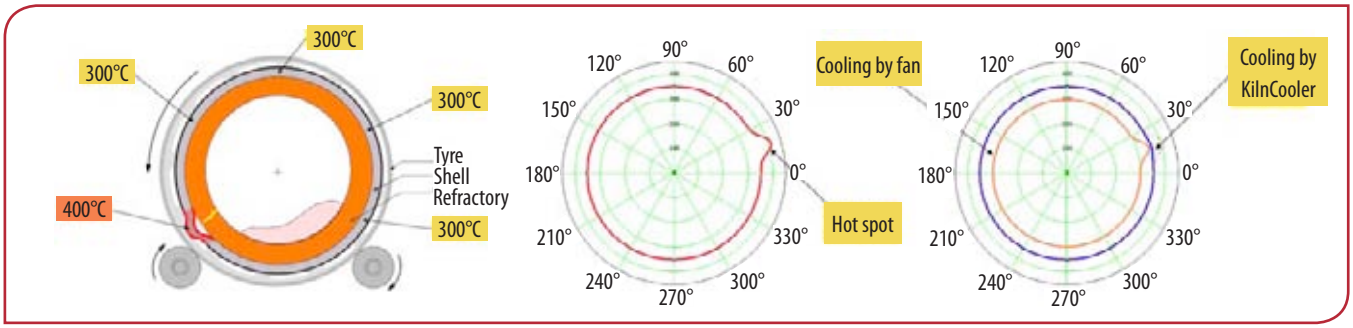
replacing the 4000t/day by higher production rates like 10,000t/day or more. If plants were able to save all of these costs by keeping the kiln in operation until the next planned shutdown, the savings could be used for other important optimisation projects.

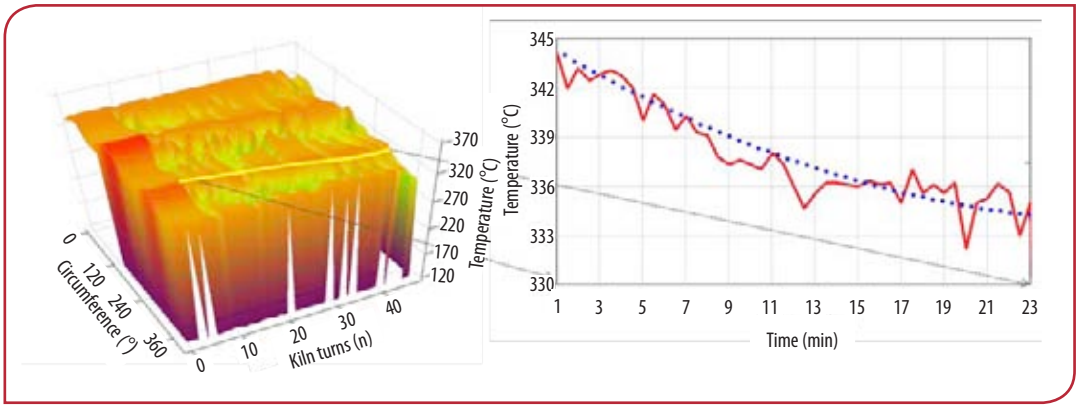
To avoid such unnecessary production losses, it is critical to cool down the kiln shell, bring the temperatures back into balance and keep them within the desired range. The key to success in this case is controlled, punctual and efficient cooling. Due to it being a liquid, the cooling efficiency of water is several orders of magnitude higher than that of air. The following example calculation (under the assumption provided in Table 2) shows this big difference in cooling efficiency. Under the assumption that the air blown to the complete kiln can be heated up by 40°C, one can dissipate roughly 2MW of thermal power by using 150,000m³/hr of air (Figure 2). The same amount of thermal power can be dissipated with 0.9L/s of water, just 3.2m³/hr water for a complete 60m kiln (Figure 3).

When spraying water to a hot metal surface one needs to take care to use the correct amount. Too much water means the cooling rate might be too high. Mechanical tensions might also occur leading to a risk of damage within the metal structures. Too little water, and the temperatures might come down too slowly or, in the worst case, continue to increase. When using the right amount of water, one can cool down temperatures as fast as necessary and stabilise them at the desired set point. To do this a water cooling system needs four main features:

1. Precise and reliable measurement of the temperature of the area that needs to be kept under control;
2. Water nozzles that allow the water to be sprayed in the right shape, thus allowing it to reach the surface as a droplet and then evaporate completely;
3. A control system to correctly dose the water;
4. A continuous self-checking feature to ensure operational safety.

Below - Figure 4: Not cooling the entire circumference makes it possible to avoid shrinking of the segment and reduce stress in the refractory. The right hand side image shows the precise treatment of only the hot area with the KilnCooler. Shrinking is limited only to the required area.





Right - Figure 5: Fundamental advantage of the KilnCooler is the controlled cooling of hot regions by a maximum of 2°C/min. This avoids 'shock' cooling and ensures slow coating development.

A basic KIMA KilnCooler unit has four nozzles, each combined with an infrared (IR) pyrometer (range of 120-1000°C (248-1832°F)) and operated by a high level control. The total cooling length for one of these portable units is 2.6m. For larger areas the same systems can be daisy-chained.

The big advantage of a water cooling system is, besides its efficiency, the possibility of punctual cooling. The water flow can be switched off and on within milliseconds, which is not possible with air blowers. This is important to reduce the temperature of a hot spot, or even a 'warm' area, back into balance with the lower temperature of the surrounding areas, which reduces the mechanical tension arising due to the difference.

While this is very effective, one also has to be aware of the risks of excessive cooling. As the water-based system cools a smaller area, there is a risk for high tension in the steel if areas are cooled to much, possibly causing damage to the refractory lining. A blower, by comparison, will cool not only the hotter areas, but also the complete circumference. While this reduces the circumferential differences, it can lead to shrinking of an entire kiln section, leading to enhanced stress for the refractory.

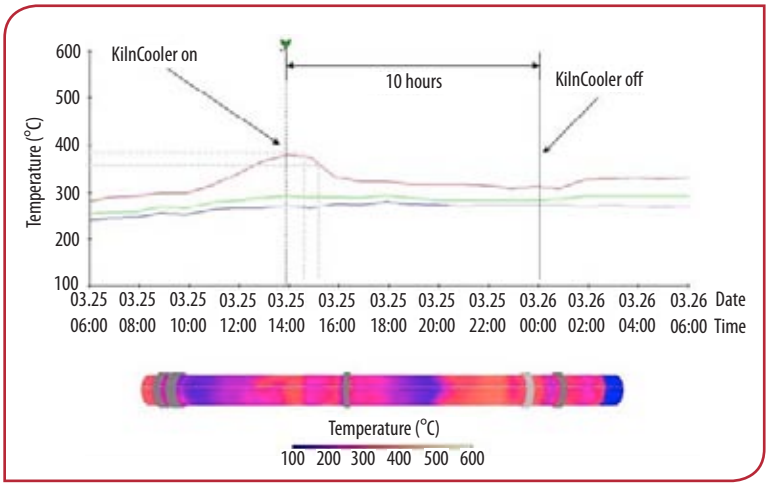
From evaluation, calculation and on-site experience, it was found that a cooling rate of 2°C per minute (Figure 5) is a good rate at which to quickly quench hot spots while keeping mechanical tensions low. This rate also leaves enough space for adjustments by the high level control if necessary. As long as the metal temperature does not reach 600°C (1112°F), spraying water onto the hot metal does not harm the microstructure of the steel. The KilnCooler controller itself is adjusted from KIMA E's site to an upper limit temperature of 500°C, as above this temperature the kiln should be stopped in any case.

Practical report from HeidelbergCement

The practical proof of a safe and highly efficient cooling of the kiln shell was particularly provided with the development partner HeidelbergCement at Ennigerloh Factory in Germany. Accompanied by the Association of the German Cement Industry (VDZ), the thermal scan taken and illustrated in Figure 6 shows a 24-hour plot observation.

The use of the system is shown on a kiln shell section being irregularly heated by more than 50°C. Starting with the commissioning of the system at about 14:00 hours, cooling down by about 50°C was achieved within two hours in this real situation. As the set point of 350°C is approached, the amount of water spray is automatically reduced significantly. Only 10 hours after start-up, the cooling system using water evaporation was switched off. The only slight increase in temperature and the stabilised status after switching off observed at that time, suggests that some coating has been newly formed in the kiln, so that further forced cooling is no longer necessary. Further case-studies in this article confirm that the treatment of a hot spot by means of the system avoids unexpected kiln stops.

Considering that the resistance of steel against alternating stress depends on many parameters, the use of the KilnCooler can be seen under another important light. Steel alters its strength depending on: Temperature; Surface finish; Metallurgical microstructure;



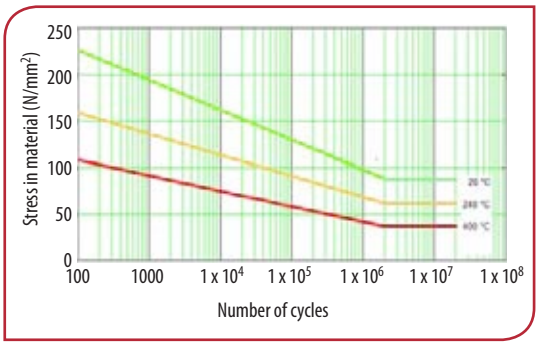
Right - Figure 6: Practical report from HeidelbergCement installation at Ennigerloh, Germany.

Presence of oxidising or inert chemicals and; Residual stresses.

However, the steel is most affected by the number of cycles it undergoes. As the number of cycles is determined by the kiln's rotation, the other parameters, especially the temperature, should be observed carefully and kept under control. To avoid fatigue of the shell, it is recommended that the temperature of the shell is kept below 400°C (752°F).

The Wöhler-Curve (Figure 7) shows, in principle, the fatigue behaviour of steel under stress, induced by an alternating load. It shows the magnitude of a cyclic stress against the logarithmic scale of cycles to failure. The number of cycles to failure is significantly reduced if the steel has an enhanced temperature. Therefore, if the steel temperature is controlled and harmonised at the entire circumference by the KilnCooler, the system can be an important tool for extending kiln life. Indeed, it makes sense to bring the KilnCooler into operation even at temperatures of 250-300°C and not just after hot spots are formed.

It is important to state at this point that when KIMA Echtzeitsysteme describes 'hot spots' we mean temperatures below 500°C and not red spots at all. If the kiln shell reaches 480°C the refractory might already be heavily damaged or totally removed. In this case the KilnCooler cannot help and the kiln should be stopped. The system should not be used to circumvent problems arising from poor maintenance or the choice of wrong or low performance refractories.



Left - Figure 7: The Wöhler Curve shows, in principle, the fatigue behaviour of steel under stress, induced by an alternating load.

Three more questions

Finally three more questions arise when talking about spraying hard water (containing lime) onto the hot kiln shell:

1. Does the resultant lime layer on the shell have any influence on the heat conduction?

Answer: There is a theoretical critical thickness at which the heat conduction from the inside of the kiln through the shell to the outside would be disrupted. However, experience has shown that this thickness is never attained due to the very dry conditions on the shell and the movement of the kiln itself. The layer breaks off the kiln well before it reaches the critical thickness.

2. Could the white stripes of the lime layer influence the reading of the kiln scanners employed?

Answer: The emissivity of limestone is 0.95, much higher than rusty steel, which is 0.69. Due to this, there is no negative influence of the lime layer on the kiln scanners.

3. Can the lime block the nozzles or tubes?

Answer: Of course the lime content in the water can lead to blockages. To avoid this, the system continuously monitors the water pressure and flow rate. In any case, blockages have not been reported so far, even with systems that have been in operation for several months. If a blockage is detected, the system will send an error message to inform operators. Removing a blockage and exchanging / cleaning the dirt trap, the nozzles or valves can be carried out within minutes.

Some case studies

Leube Cement, Gartenau, Salzburg, Austria: "In Salzburg, directly located in the Alps, a rain shower is usually heavy and puts more water onto the kiln than the KilnCooler system," said Klaus Czepl, Production Manager.

"We have used the system since August 2015. During its first winter, the system gave us more than two months of full additional production time due to quelling the first hot spots arising from the use

Below - Figure 8: Leube Cement gained two months of full additional production by using the KilnCooler in the winter of 2015-2016.

Right - Figure 9: The KilnCooler at the Holcim plant Hoever, Hannover, Germany.

of new alternative fuels and thinner than expected refractories. Just in front of the burning zone we have had serious problems creating a coating and balls were created for the first time ever in our production."

"The system enabled us to create a stable coating in that locality once more and we reached the scheduled maintenance stop in January under full production. Previously, with air cooling fans we were not able to solve the problem. Today the system is in daily use when it comes to managing coating drops and hot spots."

Holcim plant Hoever, Hannover, Germany: "When we bought the system in November 2015 we were extremely lucky," said Matthias Heuer, Production Manager. "Only a few weeks later and just before the Christmas holidays we had fundamental problems with hot spots."

"A massive hot spot as a result of very thin refractory lining and permanent coating drops were treated with the water spray kiln cooler. Within hours we developed a new coating and stabilised the temperature profile of the kiln surface."

"Without the system we would have had to stop the kiln over the two week holiday as our maintenance team was limited during this period. This meant that we were able to operate until our scheduled kiln stop in January 2016."

Afrisam, Dudfield, Lichtenburg South Africa: Theo Conradie, Process Engineer, said, "At 12.0m we had some hotter areas in which the KilnCooler reduced the temperature from 350°C to 250°C within a short time. Only a few hours later we saw a second spot at 9.0m with a temperature of 390°C. We moved the system and the temperature dropped from 390°C to 330°C in around four hours."

Right - Figure 10: The KilnCooler system in operation at the Afrisam Dudfield plant in South Africa.

Summary

The past two years of operation have shown that cement plants that suffer from temperature problems on the kiln shell were able to prolong kiln runtimes for weeks or months by using the KIMA KilnCooler. The system can take care of hot areas and keep the temperature within those areas at the desired set point temperatures. Also it has shown that, where possible, new coatings have been built up in the cooling area to provide a more even internal coating.

The system supports maintenance teams by giving them enough time to plan the necessary maintenance works and talking to the refractory suppliers. Due to the very low energy consumption, the operational costs are very low. It has been shown that the amount of water sprayed onto kiln is very low compared to the amount that drops from a rainstorm. It does not have any negative influence on the kiln steel as the system is intended for operation below 500°C only.

The cooling efficiency of water combined with the possibility of controlled punctual spraying leads to a game-changing technology when it comes to increasing temperatures on kilns at the end of a production campaign. The earlier it is used in lower temperature regions, the more effective it is at increasing the lifetime of steel and refractory.

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O Mielenz, H-J Schulze-Geiping, C Weyhofen & A Koch, HEKO Ketten GmbH

Chain case-studies from HEKO Ketten

HEKO is one of the world's leading manufacturers of chains and accessories for bucket elevators and chain conveyors for the bulk handling industry. The company manufactures a large variety of chains, chain wheels, sprockets, shafts, pans, rollers, chain accessories and unit assembly for conveyors, including bucket elevators, pan conveyors, drag chain conveyors and portal reclaimers. Over the years HEKO has become a leading manufacturer of bushed conveyor chains. Its highly wear-resistant chains and accessories are well established all over the world and their efficiency is successfully proven under the harshest environmental conditions. Celebrating 100 years of business in 2017, some cement sector case-studies from HEKO and its subsidiary KoWey are presented below...

The production of HEKO's bushed conveyor chains is performed by applying state of the art manufacturing technologies to high-grade European steel. Bolts, bushes, toothed and toothless chain wheels or segments, hubs and shafts are manufactured in state-of-the-art CNC-based machining facilities. These facilities are also used to machine the round bores in the link plates to provide a continuous high press fit between bushing/bolts and chain link plates and, additionally, to guarantee a straight and non-twisted chain. Flat link plates are produced in a modern computer-based laser cutting centre allowing for the highest precision and cost-efficient production.

In general, the service life of bushed conveyor chains depends on the wear of the chain link joint, i.e. the contact area of bolt and bushing. Accordingly, hardening is the key to the manufacture of high-quality and wear-resistant conveyor chains. This has been given high priority by HEKO for decades. The selection and definition of the appropriate heat treatment procedure is performed in order to maintain long time service life of the respected component. The company runs its own state-of-the-art heat treatment facilities for case hardening, tempering, quenching and induction hardening.

The latest step in case hardening has been the introduction of vacuum technology. Products are carburized in vacuum chambers and quenched in a helium atmosphere. High wear resistance and hardening depths are achieved, while still maintaining a tough core. Typical case hardened parts are bolts, bushes and rollers. HEKO also performs quenching and tempering under inert conditions.

The chain assembly of all HEKO bushed conveyor chains is performed using modern powerful press and individual assembly tools of the highest accuracy and the entire route of production is accompanied and controlled by extensive sample testing in the HEKO laboratory.

Exchange of bucket elevator central chain

In 2014 HEKO-KoWey delivered and exchanged spare parts, (chain, chain wheels and buckets), for a cement mill central chain bucket elevator in a cement plant in Vietnam. The bucket elevator has a bucket width of 1000mm, a bucket protrusion of 320mm, a capacity of 1060t/hr and a centre distance of 38m.

Retrofit of central chain bucket elevator

In 2014 HEKO-KoWey retrofitted a raw meal central chain bucket elevator at a cement plant in Iran. This central chain bucket elevator for kiln feeding has a capacity of 300t/hr and a centre distance of 25.5m.

Engineering

Besides the standardised HEKO portfolio of bushed conveyor chains and related assemblies, HEKO's engineers and technicians are developing reliable technical solutions and products in close co-operation with its customers.

This customised engineering is not limited to spare parts like chains and related assemblies but is also available for retrofit or upgrade of existing machines as well as realisation of new bucket elevators and pan conveyors. The company applies modern 3D computer-aided design tools for detailed engineering and plant optimisation.

Research and development

Besides the development of customised solutions, HEKO continuously optimises its standardised bushed conveyor chains and associated components in order to meet future demands in terms of conveying capacities, conveying materials and customer requests for further enhanced service life. Permanent technical exchange with universities, research institutes and clients guarantees a goal-orientated product evolution under consideration of state of the art developing and manufacturing tools. Among other developing tools modern computer based tools, for example finite element analysis, are applied for detailed optimisation and verification of progress. These theoretical methods are complemented by permanent laboratory testing and final operational trials.

Spare parts delivery for pan conveyor

In 2010 HEKO delivered and installed deep drawn pan conveyor sections (chain with pans) as spare parts for a deep drawn pan conveyor for clinker transport in Saudi Arabia. The pan conveyor has a centre distance of about 174m, an inclination height of 32.6m and a conveying capacity of 300t/hr.

New deep drawn pan conveyor for clinker

KoWey delivered and installed a new deep drawn pan conveyor for clinker transport in Iran in 2011. The pan conveyor of type KCT10 / 800-300 has a capacity of 300t/hr and a length of 155m.

ReTec Miljø ApS

Aalborg Portland achieves higher efficiency and operational reliability with the ReTec bale-opener

Aalborg Portland in Aalborg, Denmark, has been using solid recovered fuel (SRF) for many years. The SRF is burnt in the pre-calciner on a grey cement kiln line. Substitution rates have grown over the years and are currently at approximately 45%. Around 65,000t/yr of its alternative fuel is baled and wrapped SRF, which mostly arrives via sea directly into the plant. To overcome some operational issues, Aalborg Portland recently purchased a new bale-opener from fellow Danish firm ReTec Miljø ApS.

Aalborg Portland, part of the Cementir group, had been experiencing challenges with opening SRF bales that had been leading to problems further down the fuel preparation process. The earlier method used a 'robotic machine' to cut up the bale and remove the wrapping by way of an arm. However, for various reasons, this solution was not optimal and the operator frequently had to open bales individually using a front-end loader. This was leading to knock-on effects later in the fuel preparation process.

In the autumn of 2016, Aalborg Portland contacted ReTec, which demonstrated its bale-opener to the company. The result was an immediate improvement over the previous arrangement. The bales are now ripped open by the bale-opener's ripperdrum, a simple and reliable mechanical operation. The SRF produced is very loose and emerges in a consistent, continuous flow. This has enabled significant improvement downstream, for example in screening steps. The bale-opener can handle any shape or size of bale. The capacity of the plant to handle baled SRF has almost doubled to 40t/hr and, to date, there have been no issues with reliability. Good fuel quality and reliable operation has resulted in satisfaction from plant employees and a good return on investment.

Right and below: Views of the ReTec bale-opener at Aalborg Portland in Denmark.

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Vincent Grosskopf, Coal Mill Safety

Safety considerations when purchasing a stand-alone coal mill grinding system

When a complete clinker line is purchased the attention paid to the details of the coal grinding system with regards to explosion and fire protection will usually be limited to a list of standards, codes and rules to be complied with by the supplier. However, when new coal grinding systems are purchased for existing lines, the situation is similarly complex. Vincent Grosskopf of Coal Mill Safety asks some pertinent questions...

In cases when a complete clinker line is purchased, the attention paid to the details of the coal grinding system in regard to explosion and fire protection will normally be limited to a list of standards, codes, or rules to be complied with by the supplier.

In the European Union (EU) compliance with the ATEX Directives, to be complied with by both the supplier and the user, is compulsory. In North America, compliance with the relevant NFPA standards and codes are necessary.

The relevant list of standards, codes and rules will normally be provided by the company that has made it into the final round of the purchaser's discussions with suppliers. By making the adherence to the listed rules compulsory, along with a certain trust in the company that wins the order, the purchasing party will usually consider its part done.

In the EU, the future user of the system has to ensure that the part of the ATEX Directives that is to be followed is incorporated in internal rules for use of the equipment and that the chosen equipment enables the user to comply with the ATEX Directives.

Buying a stand-alone coal system

In cases in where a coal grinding system is purchased as a stand-alone unit as part of an expansion, retrofit or change in the fuel feed, the attention paid to the details of the coal grinding system in regard to explosion and fire protection could be expected to be even more intensive. However, this will normally not be the case. In practice, the resulting system will not be different from a coal grinding system that has been realised as part of a complete new clinker line.

Under these circumstances, it cannot realistically be expected that the purchasing party has the expertise to judge the explosion and fire protection-related details of the offer from the suppliers. It would also be unrealistic to expect the sales engineers of the

Right: Despite the use of oil and gas in many regions and the rapid rise of alternative fuels, coal remains the major cement production fuel. It must be safely handled when ground and fed into the kiln and, even though it is a difficult topic to broach, the onus to have the conversation is on the cement producer.

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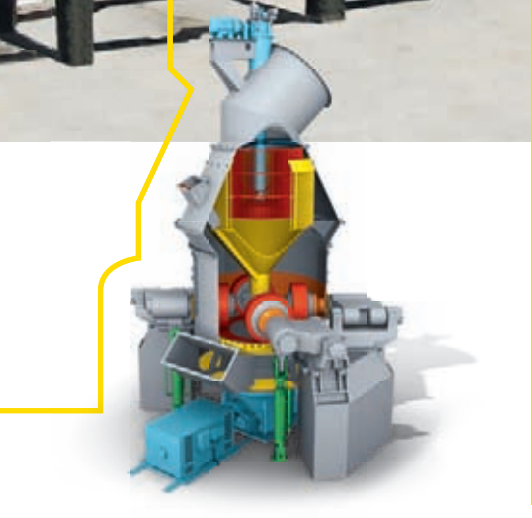

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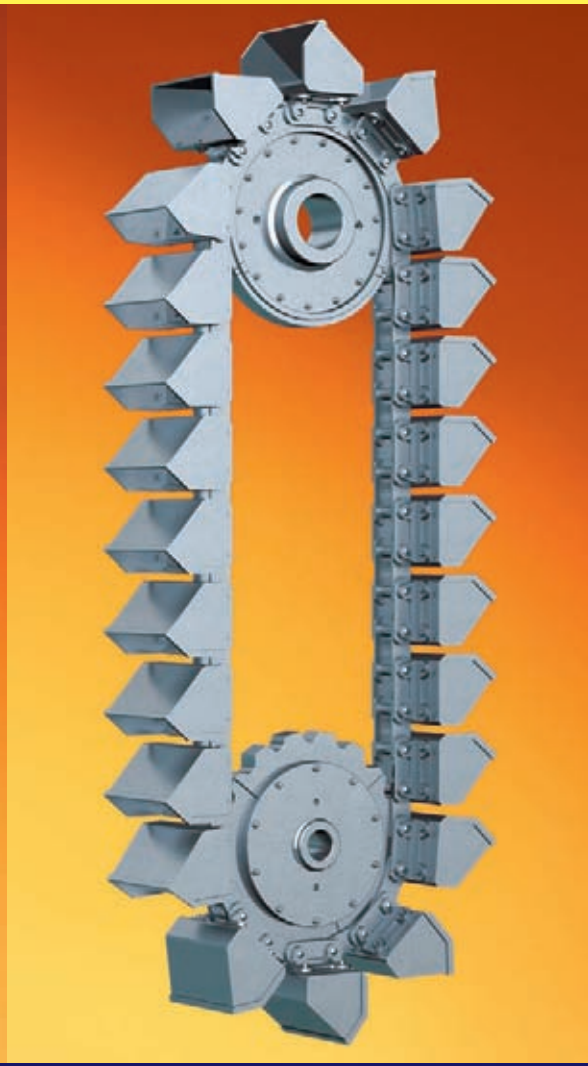

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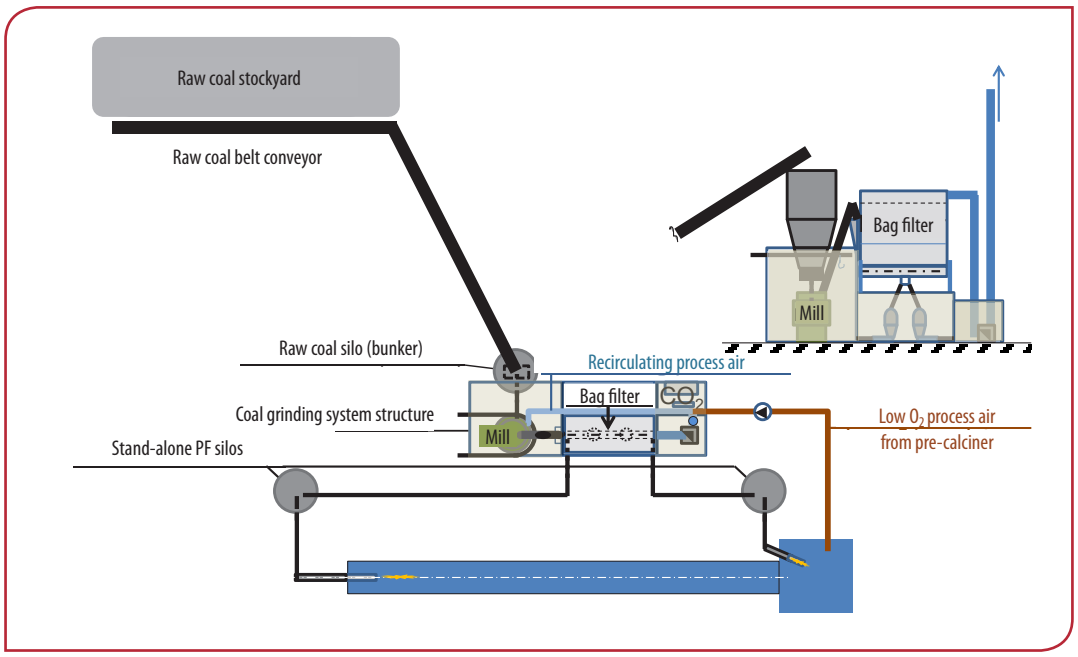

Left: Example of a modern coal mill system design. There are many areas that need to be considered during the design of a coal grinding system in terms of safety and efficiency.

suppliers involved in the finalisation of the contract to have in-depth knowledge of explosion and fire protection for coal grinding systems.

As a result, the knowledge that is available in the teams of the suppliers will not be at the centre of in-depth discussions between the parties. At best it will be in the heads of internal engineers working in the background. The purchasing party will, in most cases, take it for granted that the supplier knows what has to be known.

It's good to talk

For in-depth discussions to get started, the necessary detail and expertise has to be available to the persons at both sides of the table, which it normally is not. In-depth discussions therefore will not take place. And what are the different interests of the two parties?

The supplier

- To implement a problem-free system, with the time frame and budget not exceeded and guaranteed process-related figures met;
- To produce a system that contributes to a good reputation in the market;
- To contribute to its profit.

The purchaser

- To receive a problem-free system, with the time frame and budget not exceeded and guaranteed process-related figures met;
- To limit the costs of in-house contributions on site;

Will the supplier's 'old' design cause unnecessary costs on the purchaser's side, in terms of footprint, excessive civil engineering and larger than necessary construction works?

- To receive good support from the supplier during the construction of the system, during which the purchaser has to contribute most to the local works.

There would be conflicts of interest here if the purchasing side had the knowledge, interest and energy to ask some critical questions during the time in which the design of the system is selected but the contract is not yet signed. It is assumed all too easily that the supplier's willingness to accept the list of standards, codes and rules will lead to a correctly protected system. The standards, codes and rules don't completely cover the needs for protection and parts of these are complicated. Ways to skip complicated requirements have found their way into designs. These are hard to correct, since these 'solutions' have often been used for decades, with those responsible often unaware as to why they are wrong. The potential for conflict becomes clearer when the following questions are asked:

- Is there a reason for the purchasing side to be glad that the supplier has supplied a coal grinding system in the past that is approximately comparable with what is needed, so that that design of that system can be used again?

- Is it a good idea to 'swallow' the line that only the use of that existing design will prevent the time frame and the budget being overrun?

- Is it a good idea to help the supplier to use that existing design to save costs on both sides, as the supplier says it will?

- Will the supplier's 'old' design, due to not being modernised, result in unnecessary costs on the purchaser's side in terms of a bigger than necessary footprint, excessive civil engineering and larger than necessary construction work?

The costs of the purchaser's contribution to the overall job will hardly ever be questioned during discussions that lead to the contract but these cannot be changed after the contract has been signed.

To radically change the design of coal grinding systems, without changing the production process proper, the suppliers would have to undertake significant work to replace their often decades old designs. This long overdue work would be beneficial to all parties involved and help shape a better future in terms of lower costs for realisation, operation efficiency and lower maintenance costs.

The modification of system designs would have to include modifications of explosion and fire protection, especially in the parts which historically suffered from unclear or complicated standards, codes, and rules and therefore were often incorrect.

Apply some pressure

A modern coal mill system is characterised by:

- A small footprint;

- Short distances for the processed material and process air throughout the system;

- A simple, largely open structure with as little concrete and steel construction work as possible;

- Silos (for raw fuel and pulverised fuel) that are not inside the closed or cladded structure;

- Main baghouse not included in the closed or cladded structure;

- Optimised platforms, gangways and stairways for access and weather protection for maintenance, as well as weather protection for key pieces of equipment.

In order to get modernised and improved coal mill system designs, the users will have to exert some pressure on their suppliers, and some external input will be needed, especially when it comes to the implementation of correct explosion and fire protection in the modified systems.

Although, over the last 40 years, equipment like vertical roller mills have unquestionably improved, the modernisation of the concepts of indirect firing coal grinding systems, in which they are used, has not. The initiative that would lead to modernisation of coal grinding system concepts undoubtedly has to come from the user side. Coal mill system design has to be critically questioned and nothing can be taken for granted. Questioning has to take place at the earliest stages of planning, which requires interest and energy. When the answers for individual situations are based on the individual characteristics of a given cement plant, both suppliers and users will benefit.

Below: The Sinai White Cement plant in Egypt. Many Egyptian cement producers have rushed to use coal in recent years following a curtailment of gas subsidies. Have corners been cut in terms of safety in the quest for speed?

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Robert McCaffrey, Global Cement Magazine

Global CemProcess Conference - Reviewed

The first *Global CemProcess Conference & Exhibition* on process optimisation in cement manufacturing has successfully taken place in London, UK, with 90 delegates from 26 countries taking part, as well as 19 presentations and 12 exhibitors. The second *CemProcess Conference* will take place in 2018, with exact dates and location to be confirmed.

First day

Jose Favilla from the IBM Industrial Academy was the first speaker, looking at cyber models to create digital factories, the so-called '4th Industrial Revolution.' Digital factories are an example of a new generation of engineered systems integrating physical systems and processes with networked computing and cyber models. Favilla suggested that we are transferring from a programmable systems era to an era of cognitive or 'thinking' or 'learning' systems. At some stage in the process, an 'artificial intelligence' module may be incorporated into the system, which will eliminate the possibility of human error and which will also allow the system to improve itself over time. "The factory is just one part of the puzzle," suggested Jose. A network of cyber models will cover the entire process from quarry to concrete batching plant. The system learns from history, can maximise plant efficiency, decrease energy inputs and maximise product quality, while at the same time eliminating unexpected or emergency shut-downs. This machine-based approach, according to Jose Favilla, also "minimises the risk of 'knowledge leak.'"

The second presentation, given by **Joachim Harder** of OneStone Consulting, was on the total market potential for cement plant automation (excluding China due to the difficulty of obtaining reliable figures). Harder pointed out that there was a peak in cement plant automation expenditure of around US$800m in 2007, which fell after the financial crisis and which has now steadied at around US$600m/yr. Instrumentation is the largest value part of the automation market, followed by process automation and gas analysis. The largest market for cement automation systems was in Western Europe, with, in 2015, an 18% market share, followed by the Middle East (14%). The laboratory automation market, on the other hand, has remained strong for the last decade, albeit with a dip in 2010, and approaches around US$100m/yr. The leaders in this market are FLS, thyssenkrupp Industrial Solutions, Herzog/IMP, Sinoma and Iteca. Joe Harder concluded that the market in China is no longer a serious market for western suppliers. "The market for cement plant optimisation is on the rise. FLSmidth already generates higher revenues from cement plant services than from equipment supply."

Matthias Mersmann of aixergee Process Optimization GmbH next spoke about the possibility of the optimisation of complex systems using dynamic flow sheet simulations. "Overall plant optimisation takes into account all effects both up- and down-stream, avoids process limitations from consequent bottlenecks, requires integration of up- and down-stream equipment into the scope of consideration and requires a detailed look at the process." Mersmann suggested that a dynamic process simulation is required, taking into account that the process is "in sequence, recirculated and in parallel." Any kind of complex process unit can be split up into its process units, each of which can be interconnected to represent the complete process, for example using

1: Jose Favilla from the IBM Industrial Academy presented first on the topic of the 4th Industrial Revolution, the ultimate 'end-game' in plant optimisation and efficiency. *Turn to Page 65 for discussion about the possible implications of Jose's topic in The Last Word.*

2: Joachim Harder of OneStone Consulting, pictured during the popular *'Meet the Delegates'* session, presented on the topic of cement automation market potential to 2021.

3: Matthias Mersmann from aixergee Process Optimization explained the advantages of dynamic flowsheet simulation.

4: Vincent Grosskopf of Coal Mill Safety spoke about how coal mill system design could be improved to the benefit of process efficiency, construction efficiency and safety. *Read Vincent's written article on the themes of his presentation on Page 18.*

5: Cement Performance International's Peter Dover argued that operator development and training represent often neglected pathways to improved plant efficiency.

6: Total Lubrifiant's William Duchatelle explained Lubrilog's in-service cleaning of open gears.

the Matlab flow sheet approach. Matthias Mersmann gave details of a case study where the challenge was to integrate an RDF dryer into a complex plant, while optimising the waste heat off-take and reintroduction points. The successful decision was one that did not overtax the existing fans in the plant, and this demonstrated the usefulness of the dynamic flow sheet approach.

Vincent Grosskopf of Coal Mill Safety Pte Ltd followed to discuss the optimisation of coal mill systems and the avoidance of fires and explosions. He pointed out that fire and explosion protection starts in the coal storage yard, and continues through any pre-crusher system, onto the conveyor belt to the raw coal silo and on into the raw coal silo itself. Grosskopf pointed out that although individual pieces of equipment may have explosion protection, if they are connected to other pieces of equipment that are prone to explosion or fires, then they may be at risk of disastrous uncontrolled combustion propagation from elsewhere in the system. Explosion isolation or explosion decoupling must be provided as part of the system design, for example through the use of a double flap valve in a pulverised fuel silo baghouse funnel hopper.

7: Klaus Holz (left) and Richard Rogers (right) of Fuchs Lubricants gave a co-authored presentation on special lubricants for improved cement plant performance.

8: The *Conference Social Evening* was a London 'Magical Mystery Tour,' of major attractions around the city on a pair of London double-decker buses.

9: Felix Bartknecht of SICK AG (left) and Sezin Arıkan of Çimsa Cement (right) also gave a co-authored paper, on pyroprocess optimisation using advanced gas monitoring systems.

10: KIMA's Dirk Schmidt presented on the topic of kiln shell cooling with water. His presentation was voted third best by delegates. *Read Dirk's written article on the themes of his presentation on Page 8.*

10: Neil Taylor of Isaksson-Taylor presented on the topic of nodulisation. He was second in the voting for best presentation by delegates.

12: Loesche's Benjamin Berg was the final speaker on the first day, covering vertical roller mill optimisation.

In contrast to the first few presentations, the next speaker, **Peter Dover** of Cement Performance International Ltd, suggested that the key to process optimisation is the development of cement plant control room operators. Dover suggested that the difference between an ordinary and a great operator is around 20% in terms of performance. A number of different ways can be used to help develop outstanding operators, including experience, advice from master operators, group sessions with peers and specialists, refresher courses and e-learning.

William Duchatelle of Total Lubrifiants next outlined a total cost of ownership (TCO) approach to cleaning of open gear drives in the cement industry. He pointed out that lubricants can reduce the cost of ownership of open gears by extending the lifespan of the equipment, by increasing the lifespan of spare parts, by reducing the number of shutdowns due to maintenance and repair operations and by reducing energy consumption. An oil monitoring programme provides information regarding the condition of the fluid and on the wear level of the equipment, and can aid in the anticipation of gear failures and for the preparation of early interventions. In addition, contamination of lubricants will lead to abrasive wear and will shorten equipment lifespan: filtration devices and cleaning agents can be used to handle oil contamination, although the root causes of contamination should be eliminated if possible. On the other hand, contamination of greases and viscous fluids is more difficult to deal with since the dust is incorporated into the product. In this case, the lubricant may need to be replaced and Duchatelle outlined Lubrilog's approach to this possibility, which uses a high pressure pump to clean gears with a special solvent - even during operation.

Richard Rogers of Fuchs Lubricants UK and **Klaus Holz** of Fuchs Lubritech continued the theme of lubrication, concentrating on open gear lubrication using Ceplattyn, the first sprayable adhesive lubricant developed without using asphaltics and solvents. The lubricant is thixotropic and becomes solid when it does not move, meaning that if the gear is stopped, the lubricant becomes immobile on the gear and remains ready for start-up. At the same time, the lubricant is readily pumpable and sprayable.

At the start of the next session, on pyro-process optimisation, **Felix Bartknecht** of SICK and **Sezin Arıkan** of Cimsa Cement spoke about the optimisation of clinker burning using advanced process gas monitoring systems. Bartknecht pointed out that the composition of processes gases can be used in many way to give feedback on the 'health' of the pyro-process, in order to make process changes. Sezin gave some details of a preheater blockage problem at her cement plant. All raw material and fuel compositions were collected, but there was no correlation between these and the blockages. A SICK analyser was used to detect SO_2 levels in the process gas and it was found that when SO_2 levels in the gas were above 10,000ppm, there would be a preheater

13: Paulina Brulinska of tyre-derived fuel manufacturer Rubtiler (Vinderen Group) answers a delegate's question.

14: William Duchatelle of Total receives a visitor to the company stand.

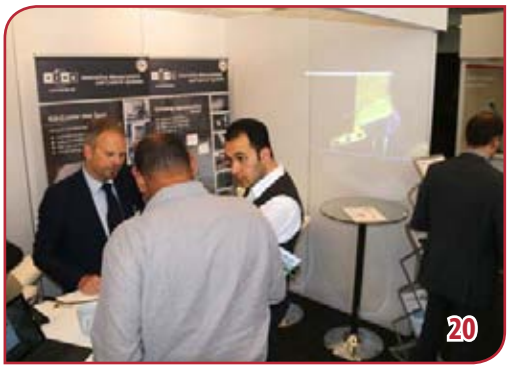
15: DMN UK's Rob Leighton (left) and Colin Dunford (right) smile for the camera.

16: Logistics software expert INFORM was represented by Dirk Schlemper (left) and Katja Krämer (right).

17: InterCem Engineering's Olaf Michelswirth deals with a number of interested visitors.

18: Bill Diggins (left) and Klaus Holz from the lubricant specialist Fuchs Lubritech / Lubricants.

19: Loesche's Benjamin Berg (left) and Robert Koert (right) of vertical roller mill expert Loesche GmbH.



20: KIMA's Dirk Schmidt (left) handles an enquiry from cement producers.

21: Silvio Campos (left) of bulk material analyser supplier Scantech receives Xavier d'Hubert, combustion consultant (right) on the company stand.

22: Discussions on the Claudius Peters Projects stand.

23: Sebastian Preuss (left) of grinding and separating expert Christian Pfeiffer answers a question.

blockage within three days. A hole in the burner was found to be a major contributory factor in the problem and after this was fixed the blockage problems were solved.

Dirk Schmidt of KIMA Echtzeitsysteme gave a presentation co-authored by the German VDZ, on kiln hot-spot treatment using IR-controlled water mist sprays for kiln shell cooling. Hot spots on the kiln shell may occur if there are localised refractory failures inside the kiln. A series of IR-pyrometers are used to measure the temperature and position of hot spots on the rotating kiln, and a logic controller is used to control a series of atomised water jets that only seek to cool the hot spots. Schmidt pointed out

24: Ulrich Mrowald of Claudius Peters Projects kicked off the second day of the conference with a presentation on clinker cooler efficiency.

25: Delegates heard about predictive model control of thermal processes from Menno Eisenga of GS, a.s.

26: Frank Lund (left) and Mette Dobel (right) from FLSmidth gave a presentation on high-level process and quality optimisation.

27: Olaf Michelswirth of Intercem drew on an example from the Democratic Republic of the Congo in his presentation.

28: Best presentation winner Donald Cameron of Primasonics spoke about 'a sonic device that works like a magic wand.'

29: KIMA's Matthias Kalkert explained how to optimise ball mill fill levels for best efficiency.

30: Matt Barlow of Hanson UK (left) and Paul Flachskampf of INFORM GmbH answer questions after their joint presentation on transport logistics optimisation.

31: Martin Rooney spoke about the rapid replacement of a mill drive slip ring motor.

that only those hot spots that have a temperature of up to 500°C should be treated using the system, since above that temperature the water would harm the micro-structure of steel. In the absence of a walkway that could be used to mount the system, a single steel tube can be rigged along the side of the kiln, which allows the system to be easily moved to the most effective place for hotspot treatment. A production manager at Leube Baustoffe was quoted as saying that due to the localised cooling of hotspots on the kiln shell, the plant was able to continue production at the full rate, all the way through to its scheduled annual maintenance. This active localised kiln shell cooling approach can also be used to promote the formation of thicker refractory coating inside the kiln.

Neil Taylor of Isaksson-Taylor next spoke on the 'missing link' of burning zone optimisation: nodulisation. Taylor pointed out that when a kiln is able to produce a uniform nodulisation of clinker, it is usually possible to push the kiln to much higher production rates of high quality clinker (MPa/tonnes). He suggested that kiln and cooler operation is most stable with clinker nodules of 3-20mm and minimal dust. Larger nodules are difficult to cool, while dust will obscure the kiln flame and smaller nodules will be blown around by process gases. Ideal nodulisation leads to optimum clinker distribution into the cooler, more uniform airflow through the cooler clinker bed, more effective cooling and heat recovery, stable secondary and tertiary air, and a stable flame and burning zone - all of which leads back to good nodulisation. Clinker nodulisation occurs after the meal components melt as they enter into the kiln, forming in a hot snowball fashion in the rotating kiln through an interaction with the melt-covered refractory coating. Optimising the conditions for alite growth in the nodules will lead to higher-strength cement. Factors that influence clinker nodulisation include flame characteristics, combustion conditions, fuel and...

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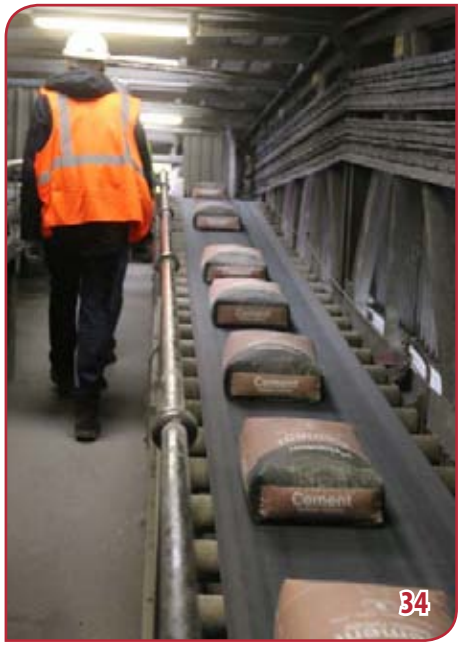
Visit to Hanson's Ketton works

The conference was followed by an informative and enjoyable field trip to Hanson's Ketton cement plant to see at first hand many instances of state-of-the-art process optimisation in the cement industry.

32: Access all areas!

33: Ketton plant manager Stewart Jones answers a question.



34: Inside the packing plant.

35: Unloading Profuel (plastic and paper).

36: Looking along the kiln - Note cooling fans.

37: Bulk cement tanker loading and dispatch.

Contents
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Algeria/Uzbekistan: Orders for Gebr. Pfeiffer

The Saoura Cement Company has chosen an MVR 5000 R-4 mill from Gebr. Pfeiffer for the new production line at its plant in Zahana, Algeria. The 425t/hr raw cement mill will grind material to a fineness of 12% R90µm and the drive will have a power of 3500kW. The expected moisture level of the input material will be 13%. The order was placed by CBMI, a subsidiary of China's Sinoma, that is building a plant upgrade for Groupe des Ciments d'Algérie (GICA).

Meanwhile, Turkey's DAL Teknik Makina has ordered an MVR 5000 R-4 cement grinding mill from Gebr. Pfeiffer for a project in the Surxondaryo region of Uzbekistan. The mill will have a 3700kW drive and it will be able to grind 400t/hr of cement. Feed material with a moisture level of up to 7% will be ground to a fineness of 12% R 0.090mm. The mill will be ready for shipping later in 2017. The project is the second mill that DAL Teknik Makina has ordered from Gebr. Pfeiffer.

Algeria: Fives installs mill for ECDE

Fives installed the first FCB B cement grinding mill in early April 2017 at Entreprise des Ciments et Dérivés d'El Chellif's (ECDE) 6000t/day clinker production line at Chlef. Installation of the mill followed the erection of the FCB kiln (Ø 5.1 x L 82m) in February 2017. A heavy lifting jack crane system sliding on rails was required to install the 4.8 x 17.8m shell and 98.5t gearbox inside its specific finished building.

Grinding mills no. 2 and no. 3 will be installed next to complete the cement grinding mills at the unit. Once complete it will include three 160t/hr FCB B-mills with 5320kW drives and associated FCB TSV4500 HF classifiers. ECDE is a member of the industrial group Ciments d'Algérie (GICA).

France: Sarens replaces filter for Eqiom's Lumbres plant

Sarens has replaced a filter at the Lumbres cement plant operated by Eqiom, CRH's French subsidiary. The filter replacement operation demanded careful study and preparation by Sarens engineers and operators. The load that was lifted weighed 230t and measured 13.7 x 10.8 x 20m, with a radius of 22m.

The Sarens team had to execute the lift in a confined space and sling on 12 points, all below the filter. The company used a CC 2800 crawler crane with full ballast and SSL, as well as 45 trucks for rigging. Working as a team, 18 Sarens crew members successfully removed the old filter and installed the new one from TS Industrie.

Ethiopia: Messebo Cement buys 200 trucks from MAN

Messebo Cement has purchased 200 trucks from Germany's MAN for US$30m. The cement producer has expanded its fleet to reduce its transportation costs. The trucks have been assembled locally by Mesfin Industrial Engineering, a sister company to Messebo, after shipping. 25 of the trucks are silo trucks for transporting bulk cement and 50 are dump trucks.

Above: One of 200 MAN trucks that have been supplied to Messebo Cement in Ethiopia.

North Africa: FLSmidth signs big plant contract

Denmark's FLSmidth has signed a contract for a cement plant valued at more than Euro100m in an unspecified location in North Africa. The contract includes engineering, equipment supply, construction supervision, commissioning and training. The plant will have a production capacity of 12,000t/day. The contract will become 'official' once FLSmidth receives a down payment for the work.

Eypt: Massive 18 mill order for Loesche

Germany's Loesche GmbH has been contracted to supply 18 new vertical roller mills to China's Sinoma CDI, which is building a six line cement plant at Beni Suef on behalf of the Egyptian Ministry of Defence. Each line will have a capacity of 6000t/day (12.6Mt/yr), making the plant one of the largest in the world.

Six raw mills, each with a capacity of 500t/hr, will grind cement raw material to a fineness of 12% R 90µm, six powerful cement mills, each with a throughput of 350t/hr will grind clinker to a fineness of 3200 Blaine and six Loesche coal mills will grind coal to a fineness of 10% R 90µm.

It is anticipated that the mills will be delivered within 2017, putting high demands on the delivery time of the mill components. Thanks to their long-standing experiences from a variety of fast-track-projects Loesche was able to carry conviction to the Ministry of Defence and assure the expected quick market entry with an elaborated plan of delivery.

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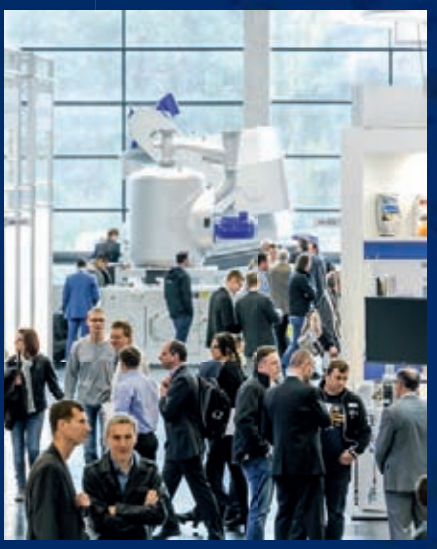

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First Concrete Sustainability Council (CSC) Certificates awarded...

Philippe Fonta Managing Director of the Cement Sustainability Initiative (CSI)

The 11 April 2017, marked a significant landmark for the concrete industry with the first Certificates for the international Concrete Sustainability Council (CSC) responsible sourcing system being awarded during 'Building Holland,' one of the major trade fairs for building, renovation and redevelopment in the Netherlands. The Certificates have been issued following an in-depth independent audit process by Kiwa, SGS and SKG-IKOB. The first companies that successfully finished the process were: ready mixed concrete companies Mebin and Cementbouw (a CRH company), which both achieved the silver standard; precast concrete companies VBI and BoschBeton, which both achieved bronze; and ORCEM, a producer of cementitious materials that was the first company in the supply chain to successfully undergo the evaluation process and achieve a score.

These are the first visible achievements of a process that started several years ago, initiated by the Cement Sustainability Initiative (CSI). Although the first CSI Agenda for Action was only focused on the impact of the cement plant and its manufacturing process, the CSI has been addressing the issue for several years. In 2009, CSI published an assessment of best practices to recycle concrete around the world.

In 2012 the CSI and Arup conducted a survey to explore material choices in sustainable construction and the decision-making processes associated with this. The aim was to understand the factors that influence senior construction professionals when considering material options in sustainable buildings. Over 200 individuals from Brazil, China, Germany, the UK and the US participated in this survey. The study showed that decision making with respect to material choice is complex. However, feedback indicated that the existence of responsible sourcing systems would be welcomed to ensure the sustainability of purchased materials. They were also deemed to offer benefit to respond to future trends, specifically the desire for greater access to information, demonstration of corporate responsibilities and to ensure future alignment with green building rating system objectives.

A responsible sourcing system provides information that identifies and promotes responsible practices throughout the whole supply chain. Such a system covers environmental, social and economic aspects of concrete production and it places the commitments of an organisation and the governance to support those commitments at the core of the assessment, with the information provided to construction professionals also being independently verified.

It is based on a set of agreed principles of sustainability, the precise scope of which is determined by stakeholder engagement. The motivation of CSI members and its experience in bringing together stakeholders (including competitors from the same sector) made the CSI the natural leading force to initiate the process. Cement, aggregate and concrete industry partners from Europe, the US, Latin America and Asia initiated the development of the responsible sourcing certification systems through a new independent organisation established in November 2016, the Concrete Sustainability Council (CSC), based in Geneva, Switzerland. The CSI is one of the current 18 members.

The CSC certification system has been developed together with a large group of industry stakeholders as well as certification institutes. It covers the raw materials, its source or provenance, its manufacture and a range of economic, social and environmental impacts. The International Union for Conservation of Nature (IUCN) led a consultation process with environmental experts and representatives from civil society focused on providing feedback on the system's environmental and social criteria. Feedback has been incorporated into the CSC technical manual and the CSC intends to continue the dialogue with civil society organisations and other stakeholders. As demand for systems certifying materials that are responsibly sourced such as LEED, BREEAM and DGNB grows, the CSC has maintained a constant dialogue with these organisations so that the CSC certification system is compatible and will be recognised by them.

A typical certification process includes a number of steps, is applicable to all sizes of concrete companies, and comprises three levels, bronze, silver and gold, which can be achieved depending on the performance and the maturity of the sustainable sourcing approach. To assess the sustainability in the value chain, verifications of cement and aggregate operations result in a score that feeds into the evaluation of the concrete plant.

The CSC certification system is available online and delivered its first certification in April 2017, paving the way for many more. The system is designed to encourage producers to continuously build on their efforts in improving sustainability performance of concrete along the whole supply chain. Importantly, CSC certification will provide independent evidence to help customers and clients demonstrate that the concrete products they purchase have been manufactured in a responsible manner and will contribute towards higher performance in green building rating systems.

For more information see:
www.concretesustainabilitycouncil.org/

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News you can use...and a new image

Koen Coppenholle Chief Executive of CEMBUREAU, the European Cement Association

MEP and EPBD rapporteur Bendt Bendtsen has outlined his vision for national long-term renovation strategies, in his newly drafted position on the post-2020 revision of the Energy Performance of Buildings Directive (EPBD).

The revision emphasises the need for strengthening provisions on buildings renovations. In this respect, Bendtsen added that EU Member States should have strategies that include policies to target the 'worst performing segments of the national building stock,' energy-poor households, social housing and households 'subject to split-incentive dilemmas'.

In addition, they should be obliged to specify how the milestones they define for 2030 and 2040 under the renovation strategies contribute to reaching the EU's climate goals. These include the 30% energy efficiency target for 2030 as well as the goal to reduce greenhouse gas emissions by at least 80% by 2050.

MEPs in the industry and energy committee have until 9 June 2017 to table amendments to the draft position, which will be debated by the committee towards the end of May. A committee vote is scheduled for 11 October 2017, while the full plenary will vote in November 2017.

On 27 April 2017 the Climate Change Committee, in which all Member States are represented, discussed and endorsed the European Commission's proposal for a Regulation to amend the EU ETS Auctioning Regulation in view of the forthcoming implementation of the Market Stability Reserve (MSR) as of January 2019.

This concerns mainly changes to the determination of auction calendars made necessary by the fact that feeds of allowances into and releases from the MSR will take place over a 12-month cycle from September to August, while auction calendars are drawn up for a 12-month calendar year cycle.

In addition the draft Regulation contains provisions necessary for the appointment of ICE Futures Europe as the UK's second opt-out auction platform.

The Commission will now submit the draft Regulation amending the Auctioning Regulation to the European Parliament and the Council for their scrutiny. Provided that they raise no objections within three months, the Commission will then adopt and publish the Regulation, after which it will directly enter into force.

And finally... The European Cement Association is proud to unveil its new look, with a new logo, a revamped website and the new CEMFOCUS newsletter switching to bi-monthly distribution.

Switzerland: LafargeHolcim appoints Sika boss Jenisch as new CEO

LafargeHolcim has announced the appointment of Jan Jenisch as its new CEO, effective from 16 October 2017. The move follows the resignation of Eric Olsen, who will leave the company on 15 July 2017, two years after he took up the CEO role and assumed responsibility for the merger of Lafarge and Holcim. Between 15 July 2017 and 16 October 2017 Beat Hess, Chairman of the Board, will become interim CEO. Roland Köhler, currently an Executive Committee member, will be appointed Chief Operating Officer.

Jenisch, aged 50, joins from Swiss company Sika AG, a developer and producer of systems and products for the building materials and automotive sectors. He has been the CEO of Sika AG since January 2012. Under his leadership, the market capitalisation of Sika has more than tripled and the company has recently gained admission to the Swiss Market Index. Jenisch joined Sika in 1996 and has worked in various management functions and countries. He was appointed to the Management Board in 2004 as Head of the Industry Division and he served as President Asia Pacific from 2007 to 2012.

Switzerland: Schuler appointed new Sika CEO

Sika has appointed Paul Schuler, currently Regional Manager Europe Middle East Africa (EMEA), as Chief Executive Officer as of 1 July 2017. He succeeds Jan Jenisch who has accepted to become the new CEO at LafargeHolcim.

Schuler has been with Sika for 29 years and has been a member of the Group Management since 2007. He served as Regional Manager North America from 2007 to 2012 and as Regional Manager for Europe, the Middle East and Africa since 2013. Schuler has played a key role in developing and executing Sika's successful growth strategy. His contributions to Sika's success include high growth rates, significant improvements in efficiency and profitability as well as responsibility for major acquisitions.

Italy: Improving picture for Buzzi Unicem

Buzzi Unicem's first quarter sales rose by 8.9% year-on-year during the first quarter of 2017 to Euro588.5m. Cement sales volumes rose by 4.5%. Favourable currency impacts lifted Buzzi Unicem's top line by Euro16.8m, while like-for-like sales were up by 5.8%.

Sales were up in all geographical areas the group is present in, with the exception of Russia in which sales were down by 1.3% in local currency terms. Buzzi Unicem said that its net debt rose to Euro979.9m at the end of the first quarter from Euro941.6m at the end of 2016.

GLOBAL CEMENT NEWS: *EUROPE*

Switzerland: LafargeHolcim sales rise

LafargeHolcim's net sales rose by 5.3% year-on-year to Euro5.21bn in the first quarter of 2017 due to higher prices and rising aggregate volumes. Its results were presented on a like-for-like basis adjusted for the group's divestments in 2016. Operating earnings before interest, taxation, depreciation and amortisation (EBITDA) increased by 8.8% to Euro652m. However, cement sales volumes remained flat at 48.1Mt for the period and even this was bolstered by a strong performance in March 2017.

"Continued pricing strength, improving volume momentum and synergies underpinned our results across the portfolio," commented the group's outgoing CEO Eric Olsen. "Our Middle East-Africa region performed particularly well, with a recovering Nigeria making a notable contribution to earnings growth. India showed encouraging signs in the quarter with the impact of demonetisation now behind us, while our US business was robust despite tough prior year comparisons on the back of mild weather in the first three months of 2016."

By region the group reported falling cement sales volumes on a like-for-like basis in Latin America, Middle East Africa and North America. In Asia Pacific cement sales volumes were stagnant but it reported 'challenging' market conditions in Indonesia and Malaysia, and a slowing market in Philippines. However, it said that the impact of demonetisation in India had abated in the period and was now 'fully' behind the business.

France: Local sales lead the way for Vicat

Improvements in its French market have led to modest gains for Vicat in the first quarter of 2017. The group's consolidated cement sales rose by 4.5% on an adjusted basis to Euro283m compared to the same period in 2016. Overall its sales rose by 1.4% on an adjusted basis to Euro554m. Its cement sales volumes rose by 1.2% year-on-year to 4.8Mt from 4.83Mt.

Greece: Titan improves in first quarter of 2017 but still makes loss

Titan Group's finances recorded an improvement in the first quarter of 2017, primarily due to the continued recovery of the US market. All geographic regions where the group operates recorded higher sales volumes with the exception of Greece, where demand remains stagnant at low levels.

Consolidated turnover was Euro361.8m, a 7.1% increase year-or-year compared to the first quarter of 2016. Earnings before interest, tax, depreciation and amortisation (EBITDA) increased by 18% to Euro51.1m. The net result after minority interests and the provision for taxes was a loss of Euro3.9m versus a loss of Euro18.6m.

The US market continues to constitute the main regional growth driver for Titan. Turnover in the country rose by 26.9% year-on-year to Euro221.2m. EBITDA almost doubled to Euro34.1m from Euro17.9m in the same period of 2016.

In Greece, residential building activity remained at very low levels, affected by the domestic economic crisis and increased uncertainty. Certain major public road projects were concluded early in 2017, leading to lower cement consumption. Export volumes were lower than the previous year due to competitive global conditions. The subdued market, coupled with increased energy costs, led to a decline in profitability. In total, group turnover for Greece and Western Europe for the first quarter of 2017 declined by 7.7% to Euro57.6m, while EBITDA, suffering from higher energy costs, fell to Euro4.4m from Euro8.3m.

Turnover in the markets of Southeastern Europe increased in the quarter but continuing competitive pressures and higher energy costs both negatively impacted profitability. Total turnover increased by 5.8% to Euro37.9m, while EBITDA declined to Euro3.8m from Euro6.3m.

In Egypt, the group's plants have been in full operation utilising locally-ground solid fuels, which allowed for an increase in production and sales volumes in the first quarter of 2017. The group said that the economy has not yet adjusted to the large devaluation of the Egyptian Pound in 2016 and a climate of uncertainty and volatility is affecting building activity and market prices. Turnover in Egypt during the first quarter was Euro45.2m, a significant increase in local currency but a 30.8% decline in Euro-terms, while EBITDA reached Euro8.9m, a 17.4% decline in Euro terms.

In Turkey demand was affected by a heavy winter and negative foreign exchange differences further impacted Adocim's results. The net result attributable to Titan was a Euro0.5m loss versus a profit of Euro0.4m.

In Brazil, despite the improvement in key macroeconomic indicators, the market remained in decline compared to the same period in 2016. The signs of improvement in the construction confidence index have yet to be translated into an increase in demand for building materials.

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GLOBAL CEMENT NEWS: *EUROPE*

Germany: HeidelbergCement takes a hit in emerging markets in first quarter results

HeidelbergCement has suffered from poor sales in Asian and African markets as it continues to integrate assets from Italcementi into the group. Its pro-forma sales revenue remained stagnant on a like-for-like basis at Euro3.78bn in the first quarter of 2017. Its cement sales volumes also remained static on a like-for-like basis at 27.8Mt. Although the group described its fortunes as 'mixed' in its emerging markets, it reported sales declines in Thailand, Bangladesh and Egypt.

"We were able to almost offset the effect of higher energy costs, bad weather conditions and increased competition in some emerging countries in the most seasonally weak quarter of the year," said Bernd Scheifele, chairman of the managing board. He added that the overall outlook for the global economy is positive despite 'major' macroeconomic and geopolitical risks. The group derives about 60% of its revenue from the US, Canada, the UK, Germany, countries in Northern Europe and Australia. As such it relies on the 'good and stable economic development' of these territories.

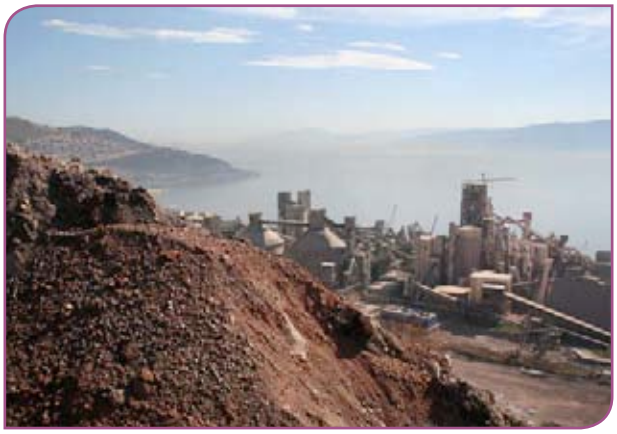
Overall the group's cement sales volumes grew by 58% to 27.8Mt from 17.6Mt due to the acquisition of Italcementi in mid-2016. Its sales revenue from its cement business grew by 49% to Euro1.9bn from Euro1.3bn.

By region, sales in Europe and North America rose in the reporting period despite a strong comparison quarter in 2016 and poor weather. Falling prices in Indonesia and Ghana were described as the main cause for falling revenue in Asia and Africa. Results in Western and Southern Europe were also damaged by higher maintenance costs year-on-year.

UK: Tarmac starts 'milk round'

Tarmac has started using a small-scale liquid lime delivery vehicle to despatch Kalic and Kalic HS milk of lime consignments to smaller or harder-to-reach locations. The eight-wheeled vehicle can carry up to 18t of milk of lime and its shorter wheelbase makes it much more manoeuvrable than larger carriers. It also comes equipped with metering capabilities and adaptable nozzle to aid delivery. The vehicle will complement Tarmac's use of bulk tankers or 1t intermediate bulk containers (IBCs).

"Many of our smaller customers require small but regular deliveries of milk of lime as they often have limited storage available on site. Our new 'milk round' allows us to regularly deliver fresh top-ups in lower volume deliveries without customers being restricted to taking small deliveries in IBCs,' said Tarmac Lime & Powders Logistics Manager Nick Thomas.



Above: The stunning view from the top of Nuh Çimento's marl and limestone quarry, looking over the plant and out to the Marmara Sea. The impressive plant is already capable of making 4.4Mt/yr of cement, with KHD's ball mill upgrade set to increase this further.

Poland: Production to rise to 17Mt in 2018

The Polish Cement Association has forecast that local cement sales will rise by 2.5% to 16.1Mt in 2017 and to 17Mt in 2018 due to growing investment in residential housing and infrastructure. However, the association also warned that the future of the European Union's Emission Trading Scheme (ETS) could have major implications for the local industry. It supported the European Parliament's amendments to the scheme in March 2017 and reinforced the high level of thermal substitution rates used in the local industry.

UK: New mill at Padeswood in 2019

It is hoped that a Euro23m upgrade project at Hanson's Padeswood cement plant will be completed in early 2019. A planning application will be submitted to the local government in the summer of 2017 following consultation with local residents. The plant intends to install a new vertical roller mill to grind cement and to build new rail loading facilities at the site.

"The plan is to mothball three of the old mills and install a new vertical roller mill capable of grinding up to 0.65Mt/yr of clinker. The new mill will be fully enclosed in a building, minimising noise and reducing the potential for cement dust to escape" said plant manager Steve Hall. The project also includes construction of new cement silos alongside the existing railway line to load trains for delivery. At present the rail link is used to bring in coal to fire the kilns. In future, three trains a week will be despatched to Hanson's depots in London, Bristol and Scotland, around 15% of the plant's output.

Left: The ATOX vertical roller mill for raw meal at the Padeswood plant will shortly be joined by a vertical roller mill for cement grinding.

Turkey: KHD wins order to upgrade Nuh Çimento ball mill

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

Nuh Çimento's plant contains one of the largest ball mills in the world with a diameter of 5.8m, a length of 17.84m and a 10.4MW drive unit. The mill has been used for around nine years at the site. For the upgrade, KHD will install two new identical Comflex grinding systems next to each other, which can be operated independently, in addition to the existing ball mill system. The new compact system will allow for a significant reduction in the installation height of the Comflex system.

The contract includes: two Comflex SC16-3250 clinker grinding units; two roller press RPM 16-170/180 with Rolcox system for control and monitoring; two VS 620 type cascade separators as static classifiers; two Sepmaster SKS-VC 3250 type efficiency separators as dynamic classifiers; two HKSK 190/265 system fans; and a two years' spare parts package including one spare roller.

Ukraine: Barry appointed as supervisory board chairperson of Podilsky Cement

The supervisory board of Podilsky Cement has appointed Leonard Barry as its supervisory board chairperson. Previously, he was the director of CRH in the country, according to the Ukrainian News Agency. Barry, aged 52 years, is an Irish national. He joined Irish Cement in 1989 as a process engineer before becoming its managing director in 2011. He trained as a chemical engineer at University College Dublin and holds an MBA from the University of Limerick.

Other personnel changes include the appointment of Declan Maguire, CRH's chief operational director for Eastern Europe, as deputy supervisory board chairperson. Alan Connolly has also been appointed as secretary of the supervisory board.

Germany: Feldhaus appointed as CEO of ThyssenKrupp Industrial Solutions

Peter Feldhaus has been appointed as the new chief executive officer (CEO) of the Industrial Solutions business division of ThyssenKrupp. Feldhaus, aged 50 years, succeeds Stefan Gesing, who was the acting CEO of the division. Gesing remains as the chief financial officer of the group. The new CEO of ThyssenKrupp Marine Systems will be Rolf Wirtz, currently CEO of Atlas Elektronik. Jens Bodo Koch, member of the management board of Atlas Elektronik, is to take over as acting CEO.

Sweden: Sandvik affected by WannaCry

Sandvik was affected by the recent WannaCry virus outbreak. The engineering company said that the ransomware worm hit its office and production environment on 12 May 2017. The company has focused on mapping the impact and executing recovery measures. It expected to deliver on customer commitments as planned and no major financial impact is currently expected.

Italy: Paolo Zugaro appointed General Manager of Cementir Holding

Paolo Zugaro has been appointed as the General Manager of Cementir Holding. He has also become the group's chief operating officer with effect from 1 May 2017. Zugaro, aged 52 years, holds a degree in electrical engineering from Tor Vergata University, Rome. He has worked in a variety of managerial roles for both Caltagirone Group and Cementir Group since 1997. Notably he has been the head of the Nordic & Baltic Region of Cementir Group, the chief executive officer (CEO) of Aalborg Portland and CEO of Unicon.

In his recent posting as the head of the East Mediterranean Region, he was the CEO of Çimentas in Turkey, Vice President of Sinai White Portland Cement in Egypt and the CEO of Recydia, a company which operates in the waste and recycling management business in Turkey and the UK.

Finland: New CEO for Finnsementti

Miikka Riionheimo has been appointed as the chief executive officer (CEO) of Finnsementti with effect from 1 June 2017. He has replaced Kalervo Matikainen, who has retired. Riionheimo has worked in a variety of roles for Hella since 2004 and also worked for Sandvik. He became the chief operating officer of Finnsementti in 2016.

Denmark: Hansen resigns as Group Executive Vice President of FLSmidth

Bjarne Moltke Hansen has resigned as the Group Executive Vice President of FLSmidth. The 57-year old Danish national started his career in 1984 working for Unicon, a subsidiary of FLSmidth at the time. He subsequently held the position as chief executive officer (CEO) of Cembrit Holding for five years before taking up the position as CEO of Aalborg Portland Holding in 2000. In 2002, Bjarne took on the position as Group Executive Vice President, Customer Services Division until he was appointed Group Executive Vice President, Product Companies Division in 2015.

Edwin Trout, Cement Industry Suppliers Forum

The UK cement industry in 2016 / 2017

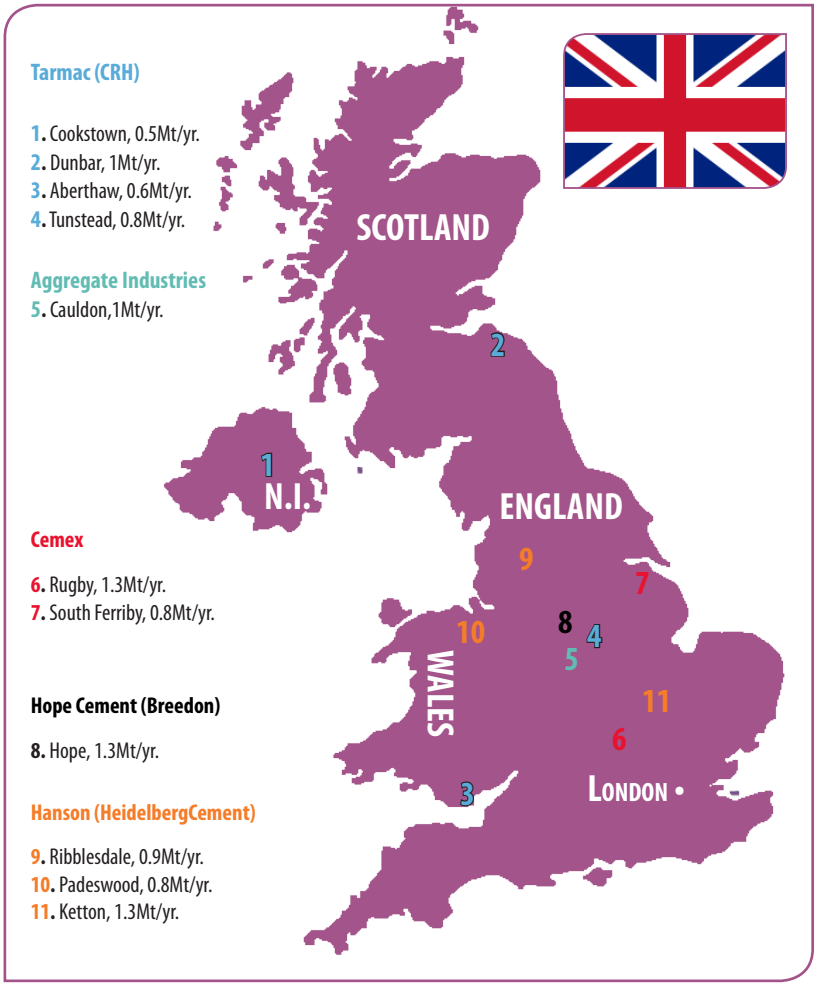
The past 12 months have been relatively quiet for the UK, as the nation entered a kind of post-Brexit-vote 'phoney war,' defined by the evolving consequences of the EU Referendum in June 2016. The economy has been stable, except for a sharp downturn in the months surrounding the referendum campaign itself, with reasonable prospects for modest growth in construction activity over the next couple of years. Here Edwin Trout of the Cement Industry Suppliers' Forum looks back over the UK cement sector in the past year...

Breedon on the march

Hope Cement: Breedon's acquisition of Hope Construction Materials was the biggest structural change in the UK cement industry in 2016. It became the latest of several mergers and disposals arising since Hope's own spin-off from the merger of Lafarge and Tarmac in 2013. The Board of Breedon Aggregates proposed to purchase Hope Construction Materials late in 2015. During the first half of 2016 the sale of 14 ready-mixed concrete plants (mainly to Tarmac) was arranged to counter likely objections on competition grounds. The firm secured approval in principle from the Competition and Markets Authority (CMA) and, after a public consultation ended on 15 July 2016, the deal was finally sealed on 1 August 2016.

The enlarged group changed its company name from Breedon Aggregates Ltd to Breedon Group plc, and was restructured into three autonomous divisions: Breedon Northern, Breedon Southern and Hope Cement, the latter with Hope's former Industrial Director Ashley Byran appointed as Managing Director. Subsequent financial results suggest that synergies within the combined business were coming through earlier than expected.

Below: Map of the UK, showing locations of integrated cement plants.



Sherburn Minerals: In November 2016, Breedon entered into a binding agreement to acquire Sherburn Minerals Group for a total consideration of up to Euro18.3m. Based in County Durham, the formerly independent Sherburn operated four quarries and five ready-mixed concrete plants, importing cement and ground granulated blast furnace slag (GGBS) from terminals at Blyth and Dundee. It has 21Mt of mineral resources and a workforce of 110 employees. Former MD Paul Allison remains with the business as a consultant.

Pro Mini Mix: Breedon announced the purchase of Pro Mini Mix at the start of May 2017. The acquisition process is ongoing.

Construction output

The period of review opened with further evidence of an ongoing tension over the accuracy of the official government figures. When, in April 2016, the Office for National Statistics (ONS) indicated that construction output in March 2016 had fallen by 3.6% month-on-month, by 4.5% year-on-year *and* that output in the first quarter of 2016 was down by 1.1% quarter-on-quarter and by 1.9% year-on-year, the Construction Products Association (CPA) commented, "Contrary to today's report, all other surveys of activity across the entire construction industry supply chain, from the largest contractors to the smallest SMEs,

have reported an *increase* in activity during the first quarter of the year compared to the previous quarter and the previous year, albeit at a slower rate than previously."

This view was shared by Richard Threllfall, Head of Infrastructure Building & Construction at KPMG. They both expected the ONS data to be revised upwards. Subsequent figures for the first quarter were down by 1.2% compared with both the preceding quarter and for the first quarter of 2015, and a 0.4% decline in the second quarter put construction into a formal recession, even before the destabilising outcome of the EU Referendum was known. This continued and new orders in the fourth quarter were 2.8% lower than in the third quarter.

Given the publicly-voiced scepticism surrounding ONS figures, it is worth examining the construction sector's own data and conclusions. The Construction Products Association (CPA), in which the cement industry is represented, regularly publishes a state of trade survey and periodic forecasts.

In May 2016, the CPA's state of trade survey indicated continued growth in sales of construction products during the second quarter of 2016, the thirteenth consecutive quarter, though manufacturers displayed a growing pessimism about prospects for the coming year ahead, even ahead of the EU Referendum. Subsequent forecasts anticipated a broadly flat level of construction activity in 2017 and 2018, with growth in infrastructure and education offsetting falls in the commercial and industrial sectors. Private housing was expected to remain stable in 2017 with a 2% fall in 2018.

However, when the latest state of trade survey was reported in April 2017, it showed that sales of construction products had risen for a 16th consecutive quarter in the first three months of 2017, having seen an increase in activity across all sections of construction. The latest forecasts are that construction output will continue to grow by 1.3% in 2017, 1.2% in 2018 and 2.3% in 2019. Growth is thought to be driven principally by an expected 28% increase in infrastructure activity and a 6.1% rise in private house building.

Above: Cemex UK has been 'flying the flag' recently. Silo trucks pictured at its Rugby cement plant in Warwickshire.

Against this renewed optimism, the CPA has expressed concern about the potentially inflationary threat of rising wages and the cost of imported material. 78% of heavy side manufacturers reported a rise in raw material costs as 2016 drew to a close.

Production of building materials

A slowdown in early 2016 is also apparent in the production returns issued by the Mineral Products Association (MPA), the cement industry's own trade body. The MPA identified a 'disappointing flattening of construction work' in the first quarter of the year, with sales of mineral products providing hard evidence, though it argued the general indicators remained positive.

This optimism continued into the second quarter, as sales of heavy building materials were better than expected, in contrast with the official ONS statistics mentioned above. Sales of aggregates, asphalt and ready-mixed concrete all improved in the second quarter. Annual sales volumes were generally positive

Below - Table 1: Comparison of Construction Purchasing Managers' Index for the UK (Markit/CIPS) and Republic of Ireland (Ulster Bank). Values over 50 indicate growth, with values under 50 representing contraction.

Year	Month	UK	ROI	Comments UK	Comments ROI
2016	Apr	52.0	56.4	The lowest since mid-2013, reflecting stagnating new business	Slowed for the second month running, weakest since Nov 2015
	May	51.2	55.9	Residential, commercial and infrastructure struggled Output growth in output weakest for nearly three years	
	Jun	46.0	59.7	First below 50 in three years; weakest for seven years	
	Jul	45.9	61.0		Total construction activity has risen continually for 35 months
	Aug	49.2	58.4	Signs that the industry may be stabilising after the Referendum	
	Sep	52.3	58.7	Above the 50 value for the first time in four months	Civil engineering returned to growth but was weakest sector
	Oct	52.6	62.3	Housing activity has remained as the key driver of growth	
	Nov	52.8	59.8		
	Dec	54.2	58.9	11-month high led by the fastest rise in new orders since Jan 2016	
2017	Jan	52.2	55.7	The first drop in growth since post-referendum recovery began	
	Feb	52.5	57.9	Civil engineering, rather than housebuilding, is the main driver	Employment index is near record levels
	Mar	52.5	60.8		

Right: The new Malpass Farm site, operated by Suez Environnement. It supplies Climafuel, a branded type of secondary recovered fuel, to the adjacent Cemex Rugby cement plant.

in the 12 months to June 2016. Aggregates and ready-mixed concrete rose by 3-4% and mortar sales increased by 2% over the year. Figures for cement production are not yet available for 2016.

However, market demand was lower in the third quarter of 2016. Sales of ready-mixed concrete fell by 1.4%, while aggregates and asphalt fell by 0.5%. After two quarters of flat volumes, mortar sales rose by 1% over the quarter. Once again, the MPA argued that the long-term prospects remained positive and indeed demand rose again in the fourth quarter, indicating some momentum in construction activity at the start of 2017. Sales of ready-mixed concrete grew by 4% compared with 2015, matched by a 4.2% increase in aggregates and a 4.6% rise in mortar sales. Overall, the Association claimed, "It is clear that MPA markets, construction and the general economy have been more resilient than anticipated."

Other indicators

Rather more bearishly, market research firm Leading Edge has substantially downgraded its expectations for construction output in 2017, pitching growth at only 1.3% compared with 2016. However, the forecast is still for growth and, like other commentators, the consultancy argues that the UK economy is still sound, with GDP forecasts in line with those of the Eurozone.

Providing a comparison with the UK's closest Eurozone economy, Ireland, is the Construction Purchasing Managers' Index (PMI) from Markit/CIPS and the Ulster Bank respectively (See Table 1). In the monthly indices issued by each, any reading below 50 signifies contraction in the market. The Brexit effect on confidence and decision-making during the summer of 2016 is made strikingly clear by the figures, but otherwise modest growth has remained fairly consistent. In the Republic of Ireland there have been wider fluctuations, but at a noticeably higher level of growth.

The Brexit effect on material costs

A recent analysis of the ONS figures suggests that the cost of building materials in general could rise by Euro664m in 2017 as a consequence of Brexit. Several other commentators have expressed similar concerns.

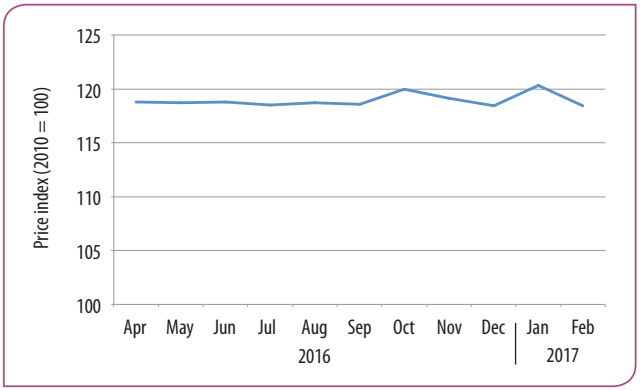
Whether or not this inflationary pressure is making its way through to cement is reflected in the Government's Price Indices of Construction Materials. The trend in cement prices appears relatively flat, with slight spikes in October 2016 and January 2017:

Unrelated to production costs, but rather to output, the supply of some materials has tightened over the past year, most particularly fly ash, as coal-fired power stations close, and as a result of a fire at a ferrous sulphate processing plant.

Commercial performance

Despite the economic landscape, the various cement businesses in the UK appear to be performing steadily. However, with most of the industry controlled by the major multinationals, it is not a straightforward matter to disentangle the fortunes of domestic cement operations from announcements of group performance. The following are simply highlights and suggest that, for the most part, returns on cement production in the UK are stable or improving.

Hope Cement (Breedon Group): Breedon delivered a strong performance in the 10 months to 31 October 2016. Both volumes and revenues in the former Breedon Aggregates business were greater than in the previous year, supplemented by a three-month contribution from the former Hope Construction Materials business. Total group revenue for the 10-month period increased by 31% to approximately Euro420.6m. By the end of 2016, the inclusion of Hope helped generate a 50% increase in pre-tax profit to Euro54.5m, on group revenues that were up by 43% to Euro529.7m.



Right: Indexed price-changes in the UK from April 2016 to February 2017.

Customer	Location	Supplier	Contract
Aggregate Industries	Import Terminals	Simon Gibson	Bulk cement haulage
	Nationwide	Eddie Stobart	Five year concrete product haulage
Hanson	Ketton	Fairport Engineering	Installation of bag filters
	Padeswood	Greenbank	Installation of GWF Feeder
	Frindsbury Wharf	SCS	Sand screening and washing system
	Nationwide	Wincanton	Ready mix concrete delivery by 70 trucks
Hope Cement	Dagenham Depot	Haver & Boecker	Adams 10 spout Roto-Packer
		Newtec Palletizing	Palletiser
		HLC	150,000 timber pallets per year
Tarmac	Tunstead	Haver & Boecker	Adams 2000 packing plant
	Mountsorrel Quarry	Ermewa	Lease of 53 77t hoppers and 48 boxes
	Nationwide	Rail Freight Services	Four year rail offloading contract
Cemex	Dagenham Wharf	Fuchs	Crane
	Nationwide	IBM	Customer-focused Apps
Francis Flower	Runcorn Terminal	SN Engineering	Construction of 3000t silo

Left - Table 2: Major contracts signed by UK cement producers in 2016 and 2017.

Tarmac (CRH): Tarmac's parent company CRH reported a 35% increase in global sales for the first six months of 2016, achieving Euro12.7bn. It doubled its earnings before interest, tax, depreciation and amortisation (EBITDA) to Euro1.12bn in the first half. Growth was, however, attributed principally to American and Asian markets.

By the end of 2016 CRH announced that global revenue and margins were ahead in all business divisions and that group sales amounted to Euro27.1bn, a rise of 15% on 2015. Gross profits were up by 69% at Euro1.74bn, helped by disposals. Operating profits were Euro2.03bn compared with Euro1.28bn in 2015. Operations in the UK, Ireland and Spain delivered strong cement volumes for CRH.

Cemex UK: Cemex has announced that, on a like-to-like basis for the ongoing operations and adjusting for currency fluctuations, consolidated global net sales increased by 4% in 2016 compared to 2015, rising to Euro12.1bn compared with 2015. Operating EBITDA on a like-to-like basis increased by 15% for the full year to Euro2.44bn versus 2015.

Fernando A Gonzalez, Cemex's Chief Executive, said, "2016 was a very good year for Cemex. Despite continued volatility and uncertainty in the markets, we were able to deliver strong underlying operational and financial results by remaining focused on the variables that we control."

During the year it was reported that UK performance over the first nine months was generally better than that of its European counterparts. In the UK cement deliveries grew by 7% and yielded a 2% rise in prices. Deliveries of aggregates grew by 6%, though prices were stable. Ready-mixed concrete volumes fell by 3%, but were offset by rising prices.

Hanson Cement (HeidelbergCement Group): HeidelbergCement has reported that its global cement volumes increased by 50% year-on-year to 30.8Mt from 20.5Mt in the fourth quarter of 2016, with aggregate sales volumes rising 16% year-on-year to 73.3Mt. Total ready-mixed concrete deliveries rose by 27% to 12.1Mm^3 and group revenue was up by 25% to Euro4.2bn. Earlier in the year, the UK was considered one of the improving markets in an overall European market described as 'robust.'

Aggregate Industries / Lafarge Cement (LafargeHolcim): Fortunes have fluctuated at LafargeHolcim, with global sales of Euro6.65bn in the second quarter and a 6% increase in operating EBITDA to Euro1.55bn. Annual figures released since then show that net profits doubled to Euro1.95bn in 2016, from Euro995m in 2015.

Eric Olsen, the CEO at the time, claimed that a 'focus on pricing and synergies' is delivering visible earning momentum and expected synergies of Euro503m. He has since resigned over the handling of the company's business interest in Syria.

Capital investment

Major investment in expanded capacity or enhanced performance has been limited since the recession led to the mothballing of entire works in 2008, with the upgrade of the Hope works latterly being the obvious exception. Over the past few months, however, Hanson has announced several major projects, following on from work on the bag filters at Ketton. In January 2017 it announced an investment of Euro29m in a seven-year project to improve production efficiency and to reduce emissions at Ribblesdale in the company's biggest investment at the site since the 1990s. Then in March 2017 came the

news that it is to invest Euro23.3m in a new cement finishing mill at Padeswood. The site currently has four mills and these would be replaced by the new mill, which would be fully-enclosed with the latest extraction technology.

Dust emissions: Hanson Cement has recently replaced two electrostatic filters with new bag filters at Ketton works to reduce particulate emissions and improve dust recovery, with Fairport Engineering acting as main contractor. Its follow-on plans at Ribblesdale will see Euro12.8m spent in the first six months on improvements to enable the plant to meet new dust-emission regulations, and includes Euro2.33m to replace the filters on two cement-grinding plants. According to plant manager, Terry Reynolds, Ribblesdale will operate well below the new dust emission levels that are being introduced in April 2018, down from 30mg/Nm^3 to 10mgNm^3.

Import facilities: There has been considerable investment in import and storage facilities, packing plants and inland haulage over the past year. Twin features have been the increased presence of GGBS import facilities and terminals run by Irish firms.

Combining both is the Irish GGBS specialist, Ecocem. This company has invested considerably in port facilities in England, at both Runcorn on the Mersey and Sheerness in Kent. The Runcorn plant officially opened in April 2016, although work has since continued on site. Sheerness followed later. In September 2016 Ecocem's Conor O'Riain was quoted as saying, "We've invested in state-of-the-art equipment to demonstrate to the market that we're here for the long term."

In a parallel development Quinn Cement has undertaken a similar expansion of its products into the UK market, investing Euro2.9m in establishing an export hub at Warrenpoint Harbour, in Northern Ireland, to complement the company's recently upgraded import facility in Rochester, Kent and Runcorn II opened in April 2017.

Runcorn is the focus of not only the Ecocem terminal, but also a significant investment in harbour storage by Francis Flower for its new GGBS business. Construction of a new 3000t silo has added 200,000t/yr of storage capacity at the company's distribution terminal on the Mersey. Competing with Francis Flower is the former owner of the business, Hanson Cement, which recently re-opened its previously mothballed grinding plant at Teesport Docks in Middlesborough. The plant was taken out of production in 2009 but an upturn in demand prompted Hanson to return to the site in 2016 and prepare it for reopening in February 2017. The project cost Euro2.3m.

Such developments in the supply of cement contradict fears voiced for the future of the UK's 90 bulk terminals, many of which face an uncertain future as imports of key dry bulk commodities fall following the high profile closure of coal-fired power stations and steel works. However, as coal and other commodities decline, so the demand for building materials, cement and the related lines of aggregate and ready-mixed concrete appears to be taking up the slack and providing an alternative trade.

Riverside aggregate terminals: Not only has Hanson re-opened its Regen operation at Teesport, but it is planning to invest Euro14m in its Victoria Deep

Right: Cemex's Tilbury plant in Essex, south east England. The number of cement and GGBS terminals in the UK has risen significantly in the past 12 months.

Left: Simon Gibson has been contracted to help Aggregate Industries with bulk cement haulage from its import terminals.

Water Terminal at Greenwich, London for the supply of concreting materials. The proposals include replacing two existing concrete batching plants with three new ones, enclosed within a new building that will also provide closed storage for raw materials. Not only will the new plants play a role in the redevelopment of Greenwich, but will also make precast components for infrastructure projects such as the Thames Tideway Tunnel and Crossrail 2.

Also on the Thames is Dagenham Wharf, where Cemex has taken delivery of a new Fuchs crane. The Euro1.8m investment comes after the wharf re-opened in November 2015 as an aggregates processing plant. Other Fuchs material handlers have been sold to Rail Freight Services Ltd to unload aggregates at a number of locations on the Thames in London. One of these is a new multi-modal terminal for building materials being developed by the Armitt Group.

Railway haulage: There is no doubt that the cement industry's use of the railways for economic and sustainable distribution is on the rise, in contrast to a decline in the overall volume of rail freight. Recent findings by BDS Marketing Research indicate that, for aggregates at least, the proportion of total output transported to market this way has increased and producers are planning additional depots to handle the expansion.

Cemex, for instance, reached its benchmark of 2Mt of material transported by rail earlier in the year in 2016 than in previous years, which is the equivalent of 65,000 truck movements being taken off the road network. The company even established a temporary depot in Warrington in 2016 to help meet growing demand in the north west. As it is, Cemex, in partnership with DB Cargo UK, runs 40 train loads a week to 11 locations around the country.

Reflecting and facilitating this growing interest, the MPA is actively lobbying MPs for access to and investment in rail freight facilities, including land for depots. Planning for such depots is not without its challenges. The proposed development of a distribution hub at the Olympic Park, currently leased to and operated by DB Schenker as a rail-freight depot, prompted a petition in the summer of 2016 that was signed by 10,000 people objecting to the establishment of concrete production facilities at the site.

Perhaps the biggest user of the railways for bulk building materials is Tarmac, which has haulage contracts with Freightliner among others and transports 9Mt/yr of material by train. Tarmac has certainly been investing in its rail freight operations over the past few months. In July 2016 the first 23 brand new MWA (102t) open box wagons, developed by Greenbrier Europe from redundant coal hoppers, became available for use by Freightliner to service its contract with Tarmac. In September 2016 Tarmac added a new fleet of railway wagons to haul aggregates from its Mountsorrel Quarry in Leicestershire. The 53 hoppers and 48 boxes, leased from French hire company Ermewa and each with a carrying capacity of 77t, increased Tarmac's train capacity by more than 15%.

A national rail-offloading contract was awarded to Rail Freight Services in October 2016, which was claimed at the time to illustrate Tarmac's ongoing commitment to railway logistics. The contract was to run for four years, with Rail Freight Services using equipment with the latest low-emission engine technology. To conclude the year with a development specifically for bulk cement, Tarmac opened a rail-freight facility at Aberthaw, Wales that will remove 2500 truck movements each year, reducing its road usage by 25%.

Given the industry's interest in the railways it seems appropriate, therefore, that a cement maker should feature in the 2016 Global Freight Awards. Hope Cement, with VTG Rail UK, won the Environment Award for their tailor-made, state-of-the-art, lightweight aluminium JPA cement wagons. These have improved Hope Cement's ability to transport over 1Mt/yr of cement a year by rail, removing over 33,000 truck loads from the road network.

Road Transport: With such an emphasis on the railways, investment in road haulage has diminished correspondingly, with outsourcing a feature of the year and an ongoing commitment to safety demonstrated. In May 2016 the then Hope Construction Materials signed a six-year contract with Wincanton to outsource its road haulage of nearly 1Mt/yr of bulk and bagged cement, roughly 600 road journeys per day. Wincanton also has contracts with Cemex and Tarmac.

Aggregate Industries, one of the largest importers of cement in the UK, signed a contract with Simon Gibson Transport in December 2016 for the collection of bulk cement from six import terminals,

including Chatham, Ellesmere Port, Glasgow, Goole, Plymouth and Ridham. The Yorkshire-based haulier will increase its fleet from 85 to 147 vehicles. Earlier in the year, Aggregate Industries signed a five-year deal with Eddie Stobart, with the result that from October 2016 deliveries of concrete products transferred to Stobart's manufacturing and industrial business unit. Bradstone, Charcon and Masterblock products from 14 UK sites are now being carried by specialist curtain-siders, flat trailers or mechanical off-load vehicles.

Although the issue of cyclist safety has been less prominent in the press than it was a couple of years ago, it continues to inform policy, prompt improvements in vehicle design and to exercise haulage operations in the industry. London remains the focus of change. In September 2016, the Mayor of London introduced a rating system for construction trucks and HGVs, based on driver visibility, in order to improve safety for cyclists. By January 2020, those vehicles with a zero rating, primarily those with a high cab and large clearance under the wheels, will be banned from London´s roads. From 2024, only trucks rated three stars or above will be allowed into the city.

Packing: Following recent trends, the industry has seen two state-of-the-art installations, each associated with recently upgraded rail-freight facilities. Hope Cement's new Dagenham Depot opened in September 2016, complete with the facility to produce Hope-branded cement bags in-house. A Roto-Packer Adams 10 from Haver & Boecker was installed, with polyethylene packaging to its own brand design. The accompanying palletiser was supplied by Newtec, operating with an output of 1200bags/hr. HLC will supply around 150,000 two-way construction pallets each year, as part of a three-year contract.

Right: Inside the new Hope Cement packing plant in Dagenham, Greater London.

Meanwhile a new packing plant was installed at Tarmac's Tunstead works, as the site celebrated its 50th year of cement production. The bespoke Haver & Boecker 10-spout Adams 2000 plant is the first of its kind in the UK. It will produce Tarmac's range of plastic packed and tubbed cement products and store the half-size 12.5kg mixer bags that have recently been introduced by Tarmac. The plant has created 23 new jobs at Tunstead.

Sustainability and industrial strategy: With sustainability an integral concept in the management of the industry, performance reporting is now routine. For example, Hanson's parent company HeidelbergCement published its 2015 sustainability report in mid 2016, highlighting the company's strategic aims and challenges in this area. Notable among its successes was a 22% reduction of CO_2 emissions, a declining clinker factor (down by 1% to 75%) and improved water management.

Reflecting collective progress, MPA Cement published its 2016 Annual Performance Report in April 2017. However, besides highlighting the industry's achievements, it contains a warning. In the report, MPA Cement's Executive Director Pal Chana writes about the 'cumulative cost burden from the implementation of climate change and energy related policies, which we estimate are going to increase by 40% to 2020 even with the limited discounting provided by government."

It is the role of the MPA to inform and influence government policy on climate change and other matters that affect the fortunes of its members, the cement makers and related producers of mineral products. The MPA has recently updated its briefing note on 'Brexit priorities for the Mineral Products industry.' The briefing outlines six key points that the MPA wishes the government to consider as it begins the process of withdrawing the UK from the EU. It has also just completed a consultation on its Proposed UK Minerals Strategy.

In the past few months the MPA has welcomed the publication of new procurement guidance for construction materials, including cement. The government is planning to use local construction materials in infrastructure projects across 18 projects by 2020. More cautiously, it has welcomed publication of the Government´s Industrial Strategy green paper, arguing that it 'must not leave behind traditional manufacturing industries ... continuous innovation is a feature of traditional business too.'

To end on a positive note for the environment, it was reported in March 2017 that, according to the agency Carbon Brief, a sharp reduction in the use of coal in 2016 has resulted in CO_2 emissions falling to a level not seen since 1898. For good or ill, official carbon policy seems to be making a difference.

Interview by Peter Edwards, Global Cement Magazine

In discussion: Navigating Brexit

The process of the UK leaving the EU has the potential to dramatically change the way that UK businesses, including foreign-owned cement producers, interact with suppliers and customers, both within the EU and further afield. To help companies best mitigate risks and identify opportunities, Aon Global Risk Consulting (AGRC) has launched its 'Brexit Navigator' tool. We spoke to AGRC's David Moloney about the tool.

***Global Cement (GC):* What led to the development of the Brexit Navigator tool?**

David Moloney (DM): Even prior to the Referendum, it was clear that Brexit needed to be factored into companies' risk models. After the vote there were an increasing number of questions from corporates around the uncertainty of Brexit and the triggering of Article 50.

However, in general terms businesses need to consider the potential impacts that Brexit could have in relation to issues like decreased capital mobility, loss of revenue, price increases, loss of competitive advantage and a possible overall reduction in market share. For stakeholders of larger businesses in particular, a failure to prepare could have further implications.

***GC:* How does Brexit Navigator help companies such as those in the cement sector?**

DM: Businesses are finding it challenging to assess, in any meaningful way, the impact of Brexit, due to the numerous potential scenarios and variables. This is why we have developed a risk based framework (akin to scenario analysis) to navigate the intricacies of Brexit. This helps businesses visualise and evaluate their situation in relation to the loss or alteration of the four fundamental 'freedoms' of EU membership; the free movement of goods, services, capital and people. The output of this process helps to progress an organisation's thinking and planning around Brexit.

The first step is risk assessment. As a capital and energy intensive industry, companies in the cement sector may want to examine their readiness for Brexit, with focus particularly on three of the 'four freedoms'; Capital, Goods and Services. They may also be exposed to a withdrawal of the 'movement of people', but perhaps less so than, say, a food manufacturer whose workforce comprises a large percentage of EU Nationals.

By mapping and profiling an organisation in relation to these variables, it becomes possible to begin to redesign the company's risk management programme. This could manifest itself in a number of ways. An obvious example for cement manufacturers could be an increase in the cost of some raw materials, if tariffs are introduced between EU member states and the UK.

***GC:* What sorts of information do companies 'input' to the Brexit Navigator?**

DM: This largely depends on the balance between quantitative and qualitative output that the client requires. Typical information inputs would be strategic planning documents, annual reports and forward looking accounts. Some of our engagements have been quite bespoke and tailored.

***GC:* What type of actions can the Brexit Navigator recommend?**

DM: Recommendations very much depend on the strategic goals of an organisation. It is critical for risk managers in the cement sector to take this moment to partner with their risk advisor in order to reassess their risk profile. They need to prioritise where they see the greatest potential impact to their business following Brexit, and ensure they are structured for resilience and future growth, with clear stakeholder responsibilities.

***GC:* How does Brexit Navigator take into account the many potential permutations that could comprise Brexit?**

GC: The real question for businesses is how well they know themselves. Preparing and developing scenario-based contingency plans for a variety of Brexit outcomes should be deemed a prudent approach when facing the unknown and also a documented process of good governance.

If your business is found to be ill-prepared for a foreseeable Brexit risk, this places in question corporate governance at the highest level and the impact this will have on organisational stakeholders, from the board to investors.

Colombia: Cementos Argos makes a loss in first quarter of 2017

Cementos Argos reported a net loss of US$15.6m in the first quarter of 2017, in contrast with a US$340m profit in the first quarter of 2016. The losses were influenced by the company's operations in Colombia, currency exchange losses and non-recurring expenses associated with implementing an efficiency plan, along with a depreciation of its assets in the United States.

The company's operating revenues also fell by 6% year-on-year to US$719m by the end of March 2017, while its earnings before interest, tax, depreciation and amortisation (EBITDA) fell by 35% to US$93.8m.

US: Eagle's revenues up for financial year

Eagle Materials' sales revenue rose by 6% year-on-year to US$1.21bn in its financial year to 31 March 2017, from US$1.14bn in the same period a year earlier. The building materials producer completed its acquisition of Cemex's Fairborn cement plant in Ohio (and associated assets) in February 2017, which contributed to its cash flow during the period. Its cement sales volumes rose by 2% to 4.87Mt from 4.78Mt.

US: Sinoma partners with Amec Foster Wheeler in US market

China's Sinoma TCDRI and Amec Foster Wheeler are forming a joint venture to sell turnkey installations for the cement industry in the US. The two engineering companies revealed their relationship in the sector at the 2017 *IEEE-PCA Cement Conference*, which took place in Calgary, Canada in May 2017. The companies are negotiating their first US tenders and hope to make an announcement later in 2017. Sinoma is one of the largest suppliers of equipment for cement plants in the world but it has yet to build a plant in the United States.

Mexico: Cemex hit by poor sales

Cemex's net sales for the first quarter of 2017 have been hit by poor sales in the US, Europe and Asia, Middle East and Africa. Its overall net sales rose by 1% year-on-year to US$3.14bn in the quarter from US$3.11bn in the same period in 2016. However, net sales fell by 2% to Euro834m in the US, by 2% to Euro711m in Europe and by 20% to Euro326m in Asia, Middle East and Africa. The group's overall cement sales volumes remained stagnant at 15.6Mt.

"We continued to see favourable results from our value-before-volume strategy during the quarter," said chief executive officer Fernando A Gonzalez. "Sequential and year-over-year pricing increased in the low- to mid-single digits for our three core products. This, together with favourable volume dynamics in Mexico and Cemex's Europe and South, Central America and Caribbean regions led to solid growth in consolidated sales and operating EBITDA, on a like-to-like basis. In addition, net income increased close to tenfold during the quarter." Gonzalez added that the group reduced its total debt by US$470m in the quarter.

By region the group reported a more mixed situation with cement sales volumes increases in all territories except for the US, Asia, the Middle East and Africa with particular strong performance in Mexico and Central and South America. In the US sales volumes suffered from poor weather in the western states and a decreasing infrastructure spend. In South, Central America and the Caribbean despite overall gains in sales Colombia reported falling cement sales volumes due to local economic issues. In Europe cement sales volumes fell by 10% in the UK yet growth was notably recorded in Spain and France. Finally, cement sales volumes fell by 9% in the Philippines and by 32% in Egypt.

Peru: Cement production falls slightly

Peru's cement production fell slightly to 2.35Mt in the first quarter of 2017 from 2.47Mt in the same period in 2016, according to data from ASOCEM, the Peruvian cement association. However, production in March 2017 rose slightly, after a period of falling monthly production figures since mid-2016. Despite this, total despatches fell by 6% to 2.3Mt in the first quarter. Exports of cement and clinker fell in the period, but imports of cement grew by 41% to 0.13Mt and imports of clinker grew by 2% to 0.13Mt.

Above: The UNACEM Atocongo plant in Peru. With a capacity of 3.5Mt/yr it is the country's largest producer by a considerable margin.

Canada: McInnis updates on rail and terminal

Plans by the state government of Quebec to rebuild the Gaspésie railway between Matapédia and Gaspé will allow McInnis Cement to increase its distribution of cement by rail significantly. Once the line has been restored the cement producer says the number of wagons it uses could rise to 2000/yr from 300/yr.

"The flexibility of the railway combined with our maritime distribution mode allows us to improve our logistics chain and reach certain markets more efficiently in all seasons," said McInnis Cement's chief executive officer Herve Mallet.

In December 2016 McInnis Cement confirmed its use of the rail for a volume of approximately 28,000t/yr over five years, through a transshipment facility in New Richmond, fed by truck from Port Daniel Gascons. Railway repairs are expected to result in the transport of at least 200,000t/yr of cement by rail.

Meanwhile, McInnis Cement has started building a terminal in the South Bronx region of New York. The 6930m^2 warehouse will be able to store 43,000t of cement and load up to 80 trucks/day. Cement will be delivered to the site from McInnis Cement's plant. A barge-mounted ship unloader travelling between New York and Providence will be used to pneumatically transfer the cement into the warehouse.

Additional features to the terminal include a 24-hour operations schedule, rooftop solar panels and a fully enclosed truck load out system that will mitigate dust. The site was chosen due to its access to the New York City Harbour. The area is also expected to see an investment of over US$45bn towards infrastructure projects and another US$6bn towards repairs following Hurricane Sandy in 2012.

"We are very excited to being one step closer to delivering cement to our customers in this area and along the east coast," said Mallet. "Once complete, the facility will set a new standard for development in the New York City Harbour, placing in harmony an industrial operation, with a natural wildlife habitat and waterfront access for citizens of the South Bronx."

McINNIS
THE NEW CEMENT COMPANY

US: Boral completes acquisition of Headwaters

Boral has completed its acquisition of Headwaters, a leading building products manufacturer and fly ash marketer in North America. Boral USA and Headwaters will form a new division to be named Boral North America, which will be headquartered in Atlanta, Georgia, the location of Boral's current US headquarters.

US: Nevada Cement fined over Clean Air Act

The US Environmental Protection Agency (EPA) has fined the Nevada Cement Company US$0.5m for violating the Clean Air Act. According to a legal complaint the cement producer made 'major' modifications to its plant in Fernley, Nevada that led to significant increased emissions of NO_x, without first obtaining a permit required by the Clean Air Act and without installing necessary pollution control equipment.

Nevada Cement has agreed to install new air pollution control technology to replace a heavy-duty diesel truck and a diesel railcar mover at the facility with clean emissions vehicles.

Above: Nevada Cement was fined US$500,000 for violating the Clean Air Act.

Argentina: Holcim importing cement

Holcim Argentina plans to import about 0.25Mt of clinker with a value of US$16.3m from May 2017 to April 2018. The product will arrive in six separate vessels carrying 41,800t each, according to the El Cronista newspaper. The cement producer says that the imports are intended to cover local demand that it can't meet with its own production base. The company's director Carlos Moreno added that the price of imported clinker is 'competitive.' The subsidiary of LafargeHolcim has a cement production of 4.8Mt/yr from plants in Campana in Buenos Aires, Malagueño in Córdoba, Puesto Viejo in Jujuy and Las Heras in Mendoza.

Panama: Cemex Panama opens first admixture plant

Cemex Panama has opened its first admixture plant in the Panama Pacifico Free Trade Zone. The unit is part of a US$15m series of investments by the construction materials company in the country, according to the El Economista newspaper. Products from the plant will be used locally and exported elsewhere in Central America and to the Caribbean.

US: PCA urges government to act on infrastructure

The Portland Cement Association (PCA), along with allied organisations, has urged the US Federal Government to not delay progress on President Donald Trump's proposed US$1tn Infrastructure Bill. It argues that the money is needed to bring US infrastructure into the 21st Century.

Writing in 'The Hill' PCA President James Toscas said that the country's infrastructure was a 'strategic asset' that 'must be funded strategically' as he called for funds to be properly allocated to maintain and expand the country's roads, railways, airports and ports. Encouraging the Administration to look at the long-term costs of competing pavements, Toscas argued for the use of concrete as a lower-cost option over multi-decade horizons.

Toscas urged those in power to commit to significant investment as soon as possible, while pointing out that US cement producers have the capacity to supply even the largest Bill. "The current condition of our infrastructure is impacting the economy and society every day," he concludes. "Yet, because these costs are spread over the entire economy and population, they are not obvious - but they are immense. Congress and the President must therefore act soon."

US: ACG buys North Florida Rock

ACG Materials has acquired North Florida Rock (NFR). ACG, a subsidiary of private equity firm HIG Capital, produces and processes industrial minerals and aggregates including gypsum, limestone, sand, gravel and downstream food, pharmaceutical and plaster products. NFR mines and produces limestone products sold into infrastructure, agriculture and building products applications. NFR owns and operates a quarry in Marianna, Florida and ships rocks across the Florida Panhandle, Alabama, and Georgia. No value for the deal has been disclosed.

"We are excited about the strategic expansion of our operations into the Southeastern US," said Paul Harrington, chief executive officer of ACG Materials. "NFR not only allows us to grow outside our core Oklahoma, Texas and Pacific Northwest markets, but also significantly expands our customer footprint and portfolio of limestone products within our expertise of mineral processing."

NFR is the sixth add-on acquisition that ACG Materials has made since HIG acquired the company at the end of 2012.

Guatemala: Cementos Progreso starts RopeCon

Austria's Doppelmayr has started up a RopeCon conveyor system for Cementos Progreso's San Gabriel plant near Guatemala City. The 1.6km conveyor will transport 2100t/hr of limestone from a quarry to the plant across wooded terrain and it rises up to a height of 200m off the ground using four tower structures. The long rope structure of the system has enabled it to use a minimum amount of space on the ground. The new cement plant is expected to start operation in the first half of 2017.

Above: The Doppelmayr RopeCon system was commissioned at Cementos Progreso's San Gabriel plant in April 2017.

Chile: Strategy rethink for Cemento Polpaico

Cemento Polpaico has changed its commercial strategy following a poor year for the construction industry in Chile in 2016. The cement producer has moved from a geographical approach to one based on the profile and sector of its customers, according to the Diario Financiero newspaper. It has also reorganised its business into three segments: retail, construction and special projects.

LafargeHolcim agreed to sell its controlling stake in Cemento Polpaico to Inversiones Caburga in late 2016. However, the transaction is still awaiting approval by the Fiscalía Nacional Económica.

US: PCA announces winners of Chairman's Awards

The Portland Cement Association (PCA) has announced the winners of its Chairman's Safety Performance, Safety Innovation and Energy and Environment Awards. The awards recognise outstanding safety performance in the manufacturing of Portland cement, creative safety-enhancing projects in the cement industry and outstanding environmental and community relations respectively.

"The facilities recognised today are to be congratulated for their safety achievements," said Allen Hamblen, the PCA's Chairman and President and CEO of CalPortland, in relation to the Safety Performance Awards.

Winners of the 2017 PCA Chairman's Safety Performance Awards:

Category: Less than 226,000hr
Buzzi Unicem USA, Chattanooga, Tennessee;
LafargeHolcim US, Morgan, Utah;
Lehigh Hanson, Tehachapi, California.

Category: 226,001 - 289,000hr
Ash Grove Cement, Foreman, Arkansas;
GCC Permian, Odessa, Texas;
Lehigh Hanson, Leeds, Alabama.

Category: 289,001 - 563,000hr
Cemex USA, Brooksville, Florida;
Cemex USA, New Braunfels, Texas;
Martin Marietta Materials, New Braunfels, Texas.

Winners of the 2017 Safety Innovation Award:

Milling/Grinding
Ash Grove Cement, Montana City, Montana.

Pyroprocessing
Cemex USA, Balcones, Texas.

Distribution
CalPortland Cement Terminal, Portland, Oregon;
LafargeHolcim US, Corporate Programme, Chicago.

Winners of the 2017 Energy and Environment Awards:

Energy Efficiency: Cemex USA Construction Materials Pacific, Victorville, California.

Environmental Performance: Cemex USA Construction Materials Pacific, Victorville, California.

Land Stewardship: Continental Cement/Green America Recycling, Hannibal, Missouri.

Outreach Winner: Mitsubishi Cement, Lucerne Valley, California.

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Indonesia: Indocement continues downward trend

PT Indocement, the second-largest cement producer in Indonesia, has reported a poor quarterly result amid stiff competition and lower cement prices. Its profit for the first quarter of 2017 was down by 53.8% to US$37.5m, despite the fact that its revenue only fell by 14.1% to US$248m.

Indocement president director Christian Kartawijaya attributed the slump to tight competition in the domestic market from other producers, such as Karawang-based PT Jui Shin and Banten-based PT Cemindo Gemilang, which frequently sell cement at lower prices. "The profit decline is inevitable amid very tight competition. Meanwhile, the cake is getting smaller, so we've experienced the decline in profits and revenue," said Christian.

Indocement, a part of major diversified conglomerate Salim Group, also cited persistent cement oversupply in the domestic market this year, while demand was estimated to rise by only 5% year-on-year to 65Mt. This pushed down the cement price by 12% in the January-March period compared to the first quarter of 2016. "As long as there is an oversupply, we can't avoid a price war," Christian added.

Despite a gloomy outlook throughout this year, the company has still earmarked a sizeable US$128m sum for capital expenditure for expansion, although the figure is still 5.9% lower than 2016. Its key projects include the development of cement terminals and cement packaging terminals in Sumatra and other undetermined sites. Christian also said Indocement would also go ahead with its plan to construct a cement factory in Pati, Central Java, which is subject to public controversy because of claims that there is no legal basis to execute it.

China: Senior management members of China Tianrui Group Cement detained in Jinan

China Tianrui Group Cement says that Yang Yongzheng, a non-executive director, and Yu Chun Liang, a joint company secretary, have been detained by the police in Jinan. The police are holding the pair on alleged violations of criminal law in relation to 'other duties which are outside the business of the company' that took place on 8 April 2017. The company added that the pair have not been held as guilty or tried at a court of law.

China Tianrui Group Cement says that the incident was not connected to the company or its subsidiaries and that it is not related to the performance of either person. It added that the 'incident' was unlikely to affect the business and operations of the group.

In early April 2017 the Jinan properties of Shandong Shanshui, a subsidiary of China Tianrui Group Cement, were occupied by a former manager of the company and his associates. In the resulting debacle, representatives of Shanshui Cement were held against their will for over two hours by a hostile crowd until local police helped them to escape.

Since then, Chong Cha Hwa has resigned as a non-executive director from China Shanshui Cement due to 'physical trauma suffered' during the 'illegal' occupation of the Jinan properties of Shandong Shanshui in early April 2017. Chong said that the occupation had impeded him from carrying out his duties.

India: Shree sales rise by 4% in fourth quarter

Shree Cement's revenue rose by 4% year-on-year to US$442m for the quarter that ended on 31 March 2017 from US$424m in the same period in 2016. However, its profit fell by 54% to US$47.5m from US$103m. The fall in profit arose from the group's power business and other income sources. The earnings before interest, depreciation, taxation and amortisation (EBITDA) after inter-segment transfers rose by 10% to US$76m from US$69m. The cement producer said that its results are not directly comparable as it adopted a change in its accounting year from the 2015 - 2016 period.

India: ACC and Ambuja start merger talks

LafargeHolcim's subsidiaries ACC and Ambuja Cement have started exploring the options for a merger. The cement producers have initiated a study to assess the benefits of the move. A special committee of directors, of which the majority are independent directors, has been constituted to commence the evaluation. The boards of both companies will make a decision once a recommendation is received from the special committee of directors and the Audit Committee.

Ambuja Cement

ACC

Above and below: Ambuja Cement and ACC have long been controlled by the same parent company. However, in brand-conscious India they have not yet considered a merger publically.

India: Dalmia selected as preferred coal bidder

Dalmia Bharat Cement has been selected as the preferred bidder for the Kesla II limestone block in Raipur District, Chhattisgarh. The block, with reserves of 215Mt, has an estimated value of US$1.6bn

India: Penna Cement under investigation

The Enforcement Directorate (ED) has filed a prosecution complaint against Penna Cement for alleged irregularities related to the allocation of land and the granting of a mining lease. The agency has also named the deceased YSR Congress chief Y S Jaganmohan Reddy, V Vijaysai Reddy, Penna Group chairman Putta Pratap Reddy and Pioneer Holdings in the case, according to the Hans India newspaper. The complaint accuses the former Andhra Pradesh state government, run by Reddy, of allocating 231 acres in Yadiki mandal of Anantapur district to Penna Cements for setting up a cement plant and officials for allowing the allocation in violation of land acquisition rules.

The ED's complaint also says that the government at the time refused mining leases to UltraTech Cement, granted a prospecting lease to Penna Cement and was complicit in other irregularities. In return for these actions the ED alleges that Penna Group invested US$10.6m in companies owned by Reddy, in violation of money laundering regulations. Previously, the Central Bureau of Investigation (CBI) filed charges against Penna Cement, Raghuram Cements and India Cements for favours they allegedly received from the Andhra Pradesh state government in 2008 and 2009.

India: UltraTech commissions Bihar slag plant

UltraTech Cement has commissioned 0.3Mt/yr slag cement grinding mill at its grinding plant at Patliputra in Bihar. The new capacity is intended to meet demand for slag cement in eastern India. With the expansion of the plant the cement producer has a production capacity of 70.6Mt/yr.

Kazakhstan: Karaganda secures US$3m loan

Karaganda cement plant has secured a US$3m loan from VTB Bank Kazakhstan to finance production growth at the unit. The Bank and Karcement JSC, which owns the cement plant, signed a corresponding agreement within the state program aimed at the development of domestic producers, according to the Trend News Agency. The plant has a production capacity of 3.6Mt/yr and it has been in operation since 1953.

Philippines: Cement importers fight selective import ban in Philippines

Two cement importers have asked the Regional Trial Court of Makati to issue a temporary restraining order against a Department of Trade and Industry (DTI) order restricting imports of cement. Fortem Cement and Cohaco Merchandising and Development allege that the Administrative Order 17-02 prevents imports of cement into the country, with the exception of importers operating integrated cement plants, according to the Manila Bulletin newspaper. The importers say that the legislation will destroy their business. They also allege that the new rules violate anti-competition rules.

The DTI has defended its legislation, although it recognises the freedom of the importers to challenge it through the legal process. The government department says it issued the revised order to help safeguard the safety of consumers by requiring the strict conduct of standards compliance tests on cement imports. The order requires the application of the Philippine Standards licenses on foreign producers of cement imports, Import Commodity Clearance on cement imports and a minimum capitalisation level for importers to prevent smaller importers.

Philippines: Republic Cement to spend up to US$300m on capacity expansion

Republic Cement & Building Materials has approved a five-year capital expenditure programme to increase its clinker and cement production capacity to meet local demand. One of the cement producer's owners, Aboitiz Group, announced that it was making the investment to take advantage of infrastructure development plans by the Duterte administration, according to the Philippines Star newspaper. The upgrade is expected to increase the company's production capacity by 1Mt/yr from its current level of 7Mt/yr. The investment will be spent on both production efficiency improvements at existing plants and by building a new kiln.

India: Ambuja 'largely' over demonetisation

Ambuja Cement says it has 'largely' put demonetisation behind it as its net sales rose by 5% year-on-year to US$395m in the first quarter of 2017 from US$375m in the same period of 2016. Its cement sales volumes rose by 3% to 6.02Mt from 5.86Mt. However, the subsidiary of LafargeHolcim's operating earnings before interest, taxation, depreciation and amortisation (EBITDA) fell by 13% to US$61m from US$70m due to higher petcoke and imported coal prices.

Philippines: Manifold defends CRH investment

Albert Manifold, the chief executive officer of CRH, has defended his company's investment of up to US$393m in the Philippines despite reporting a 12% drop in sales in the first quarter of 2017. Under questioning from analysts in a conference call, Manifold admitted that about a quarter of cement demand in the country is currently being served by imports from Southeast Asia, which is also reducing local prices. However, he insisted that local producers, including CRH, will have an advantage as they increase production capacity due to constant production and 'guaranteed' regulation and certification. Manifold also conceded that his company's performance in the Philippines illustrates the 'volatility of emerging markets.'

Vietnam: Exports increase in first four months of 2017

Vietnam exported 6.72Mt of cement and clinker worth US$235m in the first four months of 2017. This represents a 12.8% increase in volume terms compared to the first four months of 2016, but only a 7.9% rise in value terms.

In April 2017 the country's clinker and cement exports rose by 6.7% month-on-month in volume terms and by 7.6% in value to 1.92Mt at a value of US$67.4m, according to the latest data from the General Department of Vietnam Customs.

Bangladesh, the Philippines, Peru, Mozambique, Malaysia and Taiwan remained the biggest importers of Vietnamese cement and clinker in the four-month period.

At present, Vietnam has become the fifth biggest cement producer and consumer in the world after China, India, Iran and the United States. The country now has 76 cement production lines with a combined output of 82Mt/yr. It is predicted to face a glut of between 25-35Mt/yr of cement by 2020 as domestic production has outstripped the real demand and local firms have failed to compete with other exporters in the region.

Nepal: Hongshi Shivam delayed

Hongshi Shivam Cement's Sardi cement plant project in Nalwalparasi is likely to be delayed due to slow progress by the government in building a road to a nearby limestone quarry. The project was due to start production in May 2017 but the slow rate of investment by the Chinese firm's state partner has caused this completion estimate to be revised, according to the Kathmandu Post. Other infrastructure requirements for the project that are slowing it down include a 40km road to the site and an electricity substation.

India: Jaiprakash Associates misses interest payment on bonds

Jaiprakash Associates has missed interest payments on a non-convertible debenture (NCD) for more than three months. It reported similar defaults on NCDs in April 2017. The indebted cement producer is selling integrated cement plants with a production capacity of 17.2Mt/yr and grinding plants with a capacity of 4Mt/yr to UltraTech Cement.

Pakistan: Regulator rules out waste power from cement plants

The National Electric Power Regulatory Authority (NEPRA) has ruled out the option of using waste heat from cement plants as surplus energy for the national grid. The body had started investigating using waste energy from cement plants but decided that high-energy consumption at the plants minimised the possibility of any excess power.

Pakistan: Country's first dry bulk terminal for cement and coal opens

Pakistan International Bulk Terminal (PIBT), the country's first dry bulk unit for coal and cement, has started commercial operations with a consignment of coal in early May 2017. The US$285m Muhammad Bin Qasim Port, which was built with support from the World Bank, will also be used to export cement and clinker, according to the Express Tribune newspaper. The terminal is capable of handling 12Mt/yr of cargo and has a storage yard spread over 62 acres. PIBT, under a 30-year build, operate and transfer agreement with the Port Qasim Authority, built its own jetty and is equipped with two coal ship unloading cranes and one cement and clinker loading crane.

Thailand: Siam City updates network infrastructure at Saraburi plant

Siam City Cement has deployed pervasive network infrastructure and plant-wide wireless connectivity at its Plant 3 in Saraburi as part of its 'Digital Connected Plant' plan. Cisco supplied the hardware and Fujitsu helped with the system integration, according to the Nation newspaper. The upgrade is part of the cement producer's Industrial Internet of Things (IIoT) strategy where it intends to track employees, contractors and assets in real time to raise productivity and safety.

India: Ambuja launches Compocem brand

Ambuja Cement has launched Ambuja Compocem, a composite cement made from fly ash and slag. The product is being produced at its Chhattisgarh plant and it has been introduced to markets in Bihar and Jharkland. It is being marketed to all market segments including individual house builders, real estate developers and infrastructure projects.

"With the launch of Ambuja Compocem, we have achieved a three pronged sustainability approach by conserving natural resources, creating a greener product and fulfilling customer needs for a superior performance product. We call this approach delivering true value," said Ambuja Cement's managing director and chief executive officer Ajay Kapur.

India: JK Cement upgrades in Rajasthan

JK Cement has increased its clinker production capacity at its plants in Rajasthan by 3.3Mt/yr following upgrades in cooler modification, de-bottlenecking and other upgrades. The investment cost US$7.8m. Following the upgrade the cement producer had a production capacity of 5.4Mt/yr in the state.

China: CNBM grows revenue by 10%

China National Building Material Company's (CNBM)'s operating revenue grew by 10% year-on-year to US$3.03bn in the first quarter of 2017 from US$2.75bn in the same period in 2016. Its net profit grew by 50% to US$41m from US$27.6m. The result represents a turnaround in the company's performance following stagnant growth in 2016.

India: Prism gets limestone licence in Madhya Pradesh

Prism Cement has received a letter of intent from the state government of Madhya Pradesh to grant it a lease to mine cement grade limestone at Chulhi and Majhiyar, Satna district for 50 years. The lease covers reserves of about 23.6Mt and it applies to the cement producer's plants in the state.

India: Ramco Group chairman Ramasubrahaneya Rajha dies

PR Ramasubrahaneya Rajha, the chairman of business conglomerate Ramco Group, has died at the age of 82 after a brief illness. He is survived by his wife and son P R Venkatarama Rajha, the vice-chairman and managing director of the group, according to the Press Trust of India. Ramasubrahaneya Rajha was the son of the group's founder P A C Ramasamy Rajah.

Suresh Deolalkar, Director, Deolalkar Consultants

Grey becomes green - Towards green cement in India

The global cement industry is unfortunately a major contributor to the emission of CO_2, which arises from the calcining process, the combustion of fuel to produce thermal energy and the generation of electrical power, either on- or off-site. To produce 1t of cement clinker at the current average operational efficiency level, around 0.8t of CO_2 is released. Since production of cement is currently around 3.6Bt/yr and, assuming an average clinker factor of 0.8, the sector releases 2.3Bnt/yr of CO_2. Here we look at the efforts to reduce the CO_2 intensity of cement manufacturing, with a focus on the massive potential of India.

As the global population grows and human activity increases, demand for cement will grow. With *per-capita* consumption still very low in many parts of the world, (still at 200kg/capita in India for example), there is an urgent need to review the whole process of making cement and examine how to reduce emission of greenhouse gases (GHGs) like CO_2. Global bodies like the World Business Council for Sustainable Development (WBCSD) and the International Energy Agency (IEA) have come together to chalk out a plan and to fix targets for permissible levels of emission of GHGs in the coming years. India is taking an active part.

What makes cement 'green'

In this context, the world 'green' does not refer to the colour of the cement produced. It means that in producing cement, various steps and actions have been taken consciously to reduce GHG emissions, to conserve natural resources and to minimise pollution. The welfare of the surrounding community is also kept in mind.

The principal steps towards achieving the objectives are: Conserve the limestone reserves used in making cement as much as possible; Conserve fossil fuels; Minimise both thermal and electrical energy use; Use renewable sources of energy as far as possible; Conserve water; Construct 'green' buildings; Have a small mining footprint; Create green belts.

How to go about it

There are several ways to act on the above targets:

1. Make blended cements: The cement sector has produced blended cements containing blast-furnace slags (BFSC), pozzolans (PPC) and other additives for decades. This reduces the amount of clinker used.

The clinker to cement ratios of the three major types of cements are OPC = 0.95, PPC = 0.67, BFSC = 0.38. Therefore GHG emissions expressed in tonnes per tonne (t/t) of cement would be OPC = 0.76, PPC = 0.53, GBFS = 0.30. It is clear that a 'right royal route' to reduce GHG emissions is to make blended cements. In India, almost 75% of cement made is blended cement. Reducing the clinker factor also reduces the amount of limestone consumed per tonne of cement made.

Further growth in the proportion of blended cements in India is dependent on: **1.** The Bureau of Indian Standards (BIS) agreeing to increase the proportions of fly ash and slag beyond the present day limits of 30% and 60% respectively; **2.** BIS allowing production of composite cements, i.e. to permit the addition of two or more additives, for example both fly ash *and* slag.

Making blended cements is also dependent on the synchronous growth of the steel and power generation sectors, so that additives are available.

Below: The Orient Cement plant in Chittapur, Karnataka. **Photo source:** FLSmidth Pvt Ltd, entrant to the *Global Cement Photography Competition.*

2. Reduce GHG emissions from combustion: The share of CO_2 generated due to products of combustion is 0.29t at a prevailing fuel efficiency of ~700kCal/kg of clinker. There is not much scope for further reduction unless technologies are available in which the clinkering temperature is reduced appreciably. In the absence of such technologies, a significant option is the use of alternate fuels (AF), most of which are derived from wastes. Many types of AF are 'carbon neutral' in that the CO_2 emitted by combustion is already accounted for. This lowers GHG emissions.

India is starting to use AFs but it has a long way to go. There are a great many types of AF that differ greatly from one another in their properties and that require different kinds of processing to enable them to be fired in the kiln and calciner.

AFs are almost completely burnt but there are some problems that need to be overcome to be able to use AFs up to 30%. However, experience from elsewhere shows that the required technology and expertise are available. The main problem for India is the lack of infrastructure to supply AFs in 'ready-to-burn' form to cement companies.

3. Waste Heat Recovery (WHR): An indirect way to reduce GHG emissions further is to use the heat of waste gases from the preheater and the in-vent air from the clinker cooler to generate power. With current operating efficiencies, preheater specific gas volumes are about 1.4Nm^3/kg at ~270°C and cooler vents are about 2-2.2Nm^3/kg at 200-220°C.

The standard Rankine cycle is not suitable for generation of power under such conditions but the Organic Rankine Cycle (ORC), which uses organic fluids for heat transfer, is suitable. It is also possible to use the Kalina cycle, which makes use of ammonia water. As with AF use, the technology is available but the high capital costs involved are major deterrents in some world regions. The major exception is China, which leads the world in WHR references. In India there is plenty of potential for installing WHR systems, particularly in older plants that have higher amounts of waste heat available per tonne of clinker. In this arena there is a clear market for consultants that can design 'tailor made' systems to suit specific needs of cement companies and their surroundings.

4. Renewable energy: Power generated by wind and solar energy is being increasingly used by many industries to supply part of their requirements of power. There are no ongoing GHG emissions at all but there are some obvious constraints compared to conventional thermal power stations. Neither wind nor solar power is available round the clock or throughout the year, making capacity utilisation very low.

On top of these factors, the location of respective power stations is guided by the physical intensity of wind and sunlight in any given location and it may not be always possible to install the wind or solar power station close to the cement plant that needs it. Presently the economics of installing wind and solar plants are not too attractive because the capital costs per Megwatt are high and operating costs are also high compared to thermal power stations. However, due to developments in technology the costs are coming down fast. Given supportive government policies they could become viable soon.

"The path to green cement is not only a 'win-win-win' situation, it is also a 'must' situation..."

It must be remembered that the lifespan of these sources of energy is long and operating costs are negligible. Therefore levellised costs of energy are attractive. India already stands fifth in rank in producing wind power. There are several wind and solar power projects on the anvil in various states. It would not be surprising if separate grids of wind and solar power come into existence in the near future and begin to supply power the way that thermal power plants do at present.

5. Conserve water: Until now cement plants drew water from the nearest perennial sources of water like streams and rivers. In India this solution is almost never available any more as rivers and streams often do not run outside of the monsoon. Cement plants are now required to make their own arrangements for water by building check dams, constructing garland canals or digging bore wells. In either case it has become almost obligatory for cement plants to install rain water harvesting systems to replenish bore wells and to treat waste water and reuse it.

6. Mine / quarry footprint: Cement companies now plan their extraction operations so as to leave as small a foot print as possible. It involves careful use and disposal of over burden and greening of slopes in the mined areas. Low grade limestone is now also utilised to a far greater extent than in the past.

7. Green belts: It is now binding for Indian cement companies to create green belts around their plants, worker accommodation and mines/quarries. They are required to plant trees in an equivalent area.

8. Green Buildings: The concept of making maximum use of natural light and air circulation in lighting and cooling is fast becoming popular in India. Norms have been developed for such designs and newer cement companies are taking advantage. Such an approach also includes the conscious selection of high-efficiency electrical appliances, air conditioners and so forth, as certified by the Bureau of Energy Efficiency.

The Ministry of Environment and Forests (MoEF) lays down stipulations that serve as directions for

Item	OPC	BFSC
Annual cement capacity (Mt/yr)	3.5	8.7
Production capital costs (US$m)	218	327
Production capital costs (US$/t)	62.3	37.4
Capital costs for AF & WHR (US$m)	22.4	22.4
Total capital costs (US$)	240.4	349.4
Capital costs with AF & WHR (US$/t)	68.5	40.17
Increase due to AF & WHR (%)	10	7

Above - Table 1: Impact of making green cement on capital costs. Based on 10,000t/day clinker capacity when making OPC and BFSC with AF and WHR.
Source for all tables: *'Designing Green Cement Plants,'* Suresh Deolalkar.

setting up green cement plants. Each step directly and / or indirectly brings down energy consumption, which, in turn, reduces GHG emissions, conserves raw materials and ensures a cleaner environment.

Below - Table 2: Impact of making green cement on costs of production.

Item	OPC		BFSC	
	No AF/ WHR	With AF & WHR	No AF / WHR	With AF & WHR
Total variable costs (US$/t)	26.17	24.21	21.29	20.74
Fixed costs @ 85% production (US$/t)	2.27	2.40	1.36	1.42
Total costs (US$/t)	28.44	26.61	22.65	22.16
Compared to OPC with no AF / WHR (%)	100	93	80	78

Item	Cement/Clinker	GHG Emissions (t/t of cement)		
		Now	After AF	After AF & WHR
OPC	1.05	0.76	0.74	0.71
PPC (30% fly ash)	1.54	0.52	0.51	0.49
BFSC (60% slag)	2.86	0.28	0.27	0.26

Right - Table 3: Comparison of GHG emissions.

The benefits of green cement plants

The principal benefits are:

1. A Reduction in GHG emissions - Measured in tonnes per tonne of cement, switching to blended cement saves on average 50% of CO_2 emissions, from 0.8t/t for OPC to 0.4t/t for blended cements;

2. Increased reserve life - The slower use of clinker will lengthen limestone reserves;

3. Savings in fossil fuel due to using AFs - Further savings can be made by implementing WHR and renewable electrical power. Savings will vary widely on a case-by-case basis;

4. Benefits to society - Due to substantial reduction in problems of disposal of waste, particularly in cities;

5. Water recycling - To reduce 'virgin' water demand;

6. Green belts would improve the environment.

Extra capital costs

No doubt, the installation of new plant and machinery comes with an up-front cost. For example, blended cement production would require additional grinding mills, storage and dispatches facilities compared to OPC for the same clinker capacity. Additional facilities for storing, metering and feeding of AF also come with a cost, as does the installation of a WHR system. The same is the case with wind and solar power systems.

Since most of the cement plants are now designed to make blended cements, capital costs automatically include costs for additional mills and other components. What is significant is that the investment measured per tonne of annual cement capacity is much lower. The really major investments would be in WHR and renewable energy systems if installed.

Table 1 shows the capital investment to open a 10,000t/day clinker capacity plant that makes OPC and for the same plant making BFSC, with AF and WHR systems. It shows that investment costs per tonne of annual capacity come down from US$62.3/t to US$37.4/t.

However, Table 2 shows costs of production for a standard plant making OPC and for a plant making BFSC with AF feeding and WHR systems.

Table 3 shows GHG Emissions under different conditions. It can be seen that they can come down to ~ 0.285t/t of cement when making BFSC, from the present level of 0.75t/t for OPC.

New developments and technologies

There are several new technologies on the horizon and which could dominate the future. They are not yet a reality but could include carbon capture and storage (CCS), in which the exhaust CO_2 from kilns and power plants is captured, liquified and stored underground or under the sea. CO_2 could also be used to make new cements or to make chemical intermediates like formic acid.

Cement substitutes are also in various stages of development. Some are in pilot plant stage and some are being tried out in actual plants. Among them are Calera, the Calix process, geopolymers and Aether.

Conclusions

On all three fronts, capital costs, the cost of production and GHG emissions, green cement plants score better than a 'standard' plant that makes OPC. By implementing the suggestions above, the cement industry can make a positive contribution to slowing down global warming. So-called 'intangible' benefits to society in terms of cleaner environment and substantial reduction in volumes of wastes to be disposed are substantial. Cement plants designed, constructed and operated with these features would fit far better into their surroundings. Implementing each measure is not only a 'win-win-win' situation but also a 'must-situation.'

Arab Union for Cement and Building Materials

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Oman: Raysut profit slumps 62% in Q1

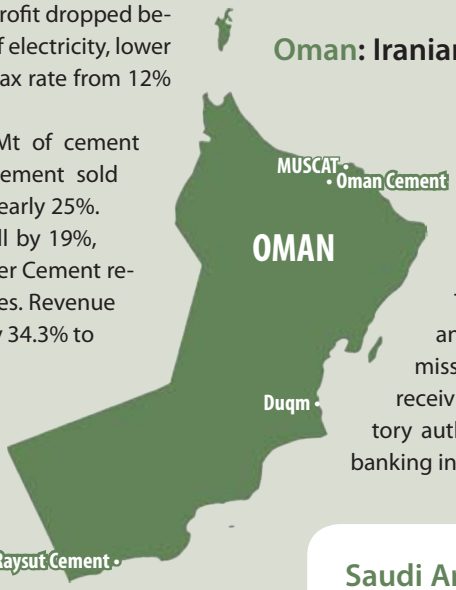
Raysut Cement has reported a 62% fall year-on-year in its net profit for the three months to 31 March 2017 due to lower sales volume and increased taxes this year. The group's net profit fell to US$8.0m against a group net profit of US$21.0m during the corresponding period of 2016.

The cement producer said that its profit dropped because of a significant increase in cost of electricity, lower sales volumes and an increase in the tax rate from 12% to 15%.

The group as a whole sold 0.76Mt of cement during the period from 1.02Mt of cement sold previously, a year-on-year decline of nearly 25%. While sales at the parent company fell by 19%, Raysut Cement's UAE subsidiary Pioneer Cement recorded a 35.4% decline in sales volumes. Revenue earned by Pioneer Cement dropped by 34.3% to US$13.3m compared to US$20.3m.

Oman: Raysut confirms JV with Oman Cement

Raysut Cement has confirmed its plans to build a new cement plant via a joint venture with Oman Cement. The cement producer announced its plans in its first quarter financial report for 2017. The new company will be called Alwasta Cement Company. As announced previously the new project will be dependent on a feasibility report. It also announced that its project with Barwaaqo Cement Company to build a terminal in Somaliland, an autonomous region of Somalia, is progressing and that work on a new packing plant is underway.



Oman: Iranian firm to build in Duqm

Iran's Hormozgan Cement has entered into a shareholder's agreement with Al Anwar Holdings to build a 1Mt/yr cement grinding plant in the Duqm special economic zone. The project is expected to have an investment of US$27m and commissioning of the project is subject to receiving approvals from relevant regulatory authorities and required funding from banking institutions in Oman.

Saudi Arabia: Q1 results round-up

Tabuk Cement made a net profit of US$2.3m in the first quarter of 2017 from revenues of US$15.3m. For the same period, Umm Al Qura Cement made a net profit of US$4.5m from revenues of US$13.8m. Saudi Cement made a net profit of US$44m and Yanbu Cement made US$33m in profit from revenues of US$81.9m. Eastern Province Cement made US$13.3m from total sales of US$53.9m. Yamama Cement's net profit fell by 66% year-on-year to US$13.5m in the first quarter of 2017. Its revenue fell by 41% to US$59m. The cement producer's cement sales fell by 25% to 1.24Mt. The result has been blamed on low cement sales and prices.

Ivory Coast: Country to import 0.15Mt of cement

The government has decided to import 150,000t of cement from April to July 2017 to cope with a local shortage. Cement will be imported in a strict agenda including 61,000t in May 2017, 64,000t in June 2017 and 25,000t in July 2017, according to the La Afrique Tribune newspaper. The government is also hoping that on-going cement plant projects will meet local demand when they are commissioned. The country previously imported cement to meet local shortages in 2015 when 300,000t was imported in three phases.

Algeria: Country to hit surplus

Abdesslem Bouchouareb, the Minister of Industry and Mines, has said that Algeria will report a surplus in cement production later in 2017. The minister said that the country is expecting to produce 30Mt of cement due to newly commissioned plants, according to the Algeria Press Service. He added that a 'disturbance' in the cement market had been caused by speculation and that the government was determined to protect the local economy. The minister previously announced the commissioning of new plants at Adrar and in Biskra in April 2017.

Tanzania: Tanga Cement revenue falls

Tanga Cement's revenue dropped by 20% year-on-year to US$75m in 2016 from US$94m in 2015 due to competition and lower government spending on infrastructure. However, despite falling net profits, it managed to increase its operating earnings before interest, taxation, depreciation and amortisation (EBITDA) to US$17m from US$13m following cost cutting. The cement producer commissioned its second integrated production line in August 2016, increasing its production capacity to 1.3Mt/yr.

Nigeria: Dangote sales value rises against backdrop of lower sales

Dangote Cement's sales revenue and earnings rose in the first quarter of 2017 due to higher prices, despite a significant fall in cement sales volumes in its home country. Its sales revenue increased by 48.1% year-on-year to US$682m from US$460m in the same period of 2016 and its earnings before interest, taxation, depreciation and amortisation (EBITDA) rose by 42.3% to US$337m from US$237m. However, its cement sales volumes fell by 6.4% to 6.03Mt from 6.44Mt caused by a drop of 16.5% in Nigeria.

"Dangote Cement produced record financial results in the first three months of 2017. Despite lower group volumes, we delivered significantly higher revenues and EBITDA after realigning prices late in 2016. Our new pricing strategy meant every tonne worked harder for us in Nigeria, delivering 78.4% more EBITDA/t than the same quarter last year," said chief executive officer Onne van der Wijde. He added the group has started sourcing coal from Nigerian mines run by its parent company, Dangote Industries, and that this had improved margins, reduced its need for foreign coal and the foreign currency required to buy it.

The group has continued to grow its operations outside of Nigeria to the extent that they represent 28% of its revenue. It reported a 'good' start for a new import and bagging facility in Sierra Leone that began operations in January 2017 and had expected to start a 1.5Mt/yr plant in Congo in May 2017.

Above: Aliko Dangote, President and CEO of Dangote Industries.

Ethiopia: Habesha Cement plant inaugurated

The Ethiopian Prime Minister Hailemariam Dessalegn has inaugurated Habesha Cement's 1.4Mt/yr plant at Holeta in Oromia. The US$140m unit was built by Chinese contractor Northern Heavy Industry, according to the Ethiopian Herald newspaper. Dessalegn said that the new plant is part of the national plan to surpass local cement production of 27Mt/yr by the end of the Second Growth and Transformation Plan (GTP II) that will end in 2020. The plant is now expected to create 600 jobs in its operational phase.

The subsidiary of PPC is the third international project the South African cement producer has completed over the last year. On 17 April 2017 PPC Barnet in the Democratic Republic of the Congo (DRC) despatched its first truckload of saleable cement from the plant near Kimpese in the Congo Central. The 1Mt/yr cement plant was commissioned in February 2017.

"With the completion of the plants in the DRC and Ethiopia we have achieved two significant milestones in our quest to become a major player in the cement industry across Africa" said Njombo Lekula, Managing Director, International operations, PPC. "Both plants have been built using the latest technologies, in line with international standards."

Above: The Habesha Cement plant in Holeta, Oromia was inaugurated in style in April 2017.

Tanzania: Mbeya to collaborate with Kibo Mining

Kibo Mining has signed a memorandum of understanding with Mbeya Cement, a subsidiary of LafargeHolcim, to collaborate regionally and to share materials in the Mbeya and Songwe regions. The agreement includes arrangements to supply coal, limestone, fly ash, electricity and cement between the parties. It also includes plans to bring together local development bodies to develop the region.

Kibo Mining operates a thermal coal deposit at Mbeya and it is developing a 250 – 350MW coal power plant at the site with the help of Chinese contractors.

Ethiopia: Ambi Gnemer to build US$44m grinding plant

The Oromia state government has started negotiations with Ambo Gnemer about building a US$44m cement grinding plant. The company owns land in the state and it intends to develop a site at Ambo. Previous attempts to develop the plant failed due to a lack of capital.

Nigeria: AshakaCem chairman resigns

Mallam Suleiman Yahyah has resigned as chairman from AshakaCem. Yahyah joined the board of directors of the subsidiary of LafargeHolcim in 2010 and became its chairman in 2015.

Libya: Libyan Cement Co to reopen Hawari plants

The Libyan Cement Company (LCC) has announced plans to rebuild and reopen two cement plants in Benghazi and Hawari. Ahmed Ben Halim, the chairman of parent company Joint Libyan Cement Company (JLCC), said that the priority was getting the plants near Benghazi operational again, according to the Arab Times newspaper. The plants closed in mid-2014 and remained under militant control until mid-2016.

Unfortunately, the plants were damaged in fighting in 2016. Following a survey LCC says that extensive rebuilding will be required and this may take up at least one year. Repair work will be covered by the company's Political Violence Insurance policy with Lloyds of London.

LCC is 90% owned by the JLCC, a joint venture between Asamer Libya and the Economic and Social Development Fund. Asamer Libya was purchased in 2015 from Asamer by Libya Holdings Group, a company run by Ben Halim. LCC also operates a third cement plant at Derna that has remained operational throughout the conflict.

Qatar: QNCC profit falls in first quarter

Qatar National Cement Company (QNCC) reported that it made a net profit of US$23.3m in the first quarter of 2017, a 31% fall compared to a net profit of US$34.0m posted for the first quarter of 2016.

QNCC is currently in the process of constructing a 5000t/day production line, its fifth, along with Fives Group of France. Fives installed the 6.6MW FCB B-mill of the raw meal grinding plant in March 2017. Installation of the raw mill shell was completed on 29 March 2017. The shell weighs 198t, has a length of 17.2m and a diameter of 6.4m. It was moved and erected using a self-propelled modular transporter. This project step followed the commissioning of the two FCB B-mills at the cement grinding plant in January and February 2017, and the signature of the related provisional acceptance.

Above: The skyline of Doha, capital of Qatar, where QNCC is building its fifth cement line.

Morocco: LafargeHolcim to launch Laâyoune grinding plant

LafargeHolcim is preparing to inaugurate its Laâyoune cement grinding plant. The unit is expected to join Ciments du Maroc, a subsidiary of HeidelbergCement, that also operates a grinding plant in the south of the country, according to the Aujourd'hui Le Maroc newspaper. In addition to these plants, Anouar Invest also announced plans in late 2015 to build a 0.5Mt/yr cement plant in the region under the name of Ciment Sud (CIMSUD).

Jordan: Government helps in Lafarge Jordan dispute

The Labour Ministry has helped to resolve a dispute between workers and management at Lafarge Jordan. Following several days of work stoppages the employees have agreed to sign a collective work contract and resume work as normal, according to the Jordan Times. In return workers at the Rashadia cement plant will receive a bonus payment at Eid Al Fitr and will then receive pay increases based on performance. The parties have also agreed to let the ministry lead future talks on early retirement and workers' association bans on employees.

Tunisia: Carthage bidding process starts

Al Karama Holding, a Tunisian state-owned company, has initiated a bidding process to sell its stake in Carthage Cement. The company has started a consultation process with investment banks and consultation firms to help it sell its direct and indirect stakes in BINA Group, which includes Carthage Cement. The deadline for bids is 16 June 2017. The government owns an estimated 41% share of the cement producer.

Saudi Arabia: Hail gets export licence

Hail Cement Company has obtained an export licence from the Ministry of Commerce and Investment. The licence is valid for one year from the date of issue. No significant financial impact is expected upon the financial results of the company.

Algeria: ASEC sells ASEC Ciment Algerie

ASEC Cement Company and ASEC Cement Djelfa Offshore have sold their 100% stake in ASEC Ciment Algerie to an Algerian investor for US$60m. ASEC Cement is based in Egypt, while ASEC Cement Djelfa and ASEC Ciment Algerie are based in Algeria.

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 other countries that are not shown here, including China, Nepal, Qatar and Cameroon.

India: Cement prices across India returned to 'pre-demonetisation levels' in April 2017 after being negatively impacted by the note ban that was put into effect in November 2016. "With the impact of demonetisation gradually subsiding, cement prices reached pre-demonetisation levels in April 2017 in most markets," said Sabysachi Majumdar, senior vice-president and group head at ICRA Ratings.

Prices had earlier declined by 16-17% in the western and southern regions between November 2016 and January 2017 and started to increase again in February 2017 to reach US$4.10/bag (50kg). They rebounded to US$5.03-5.18/bag in April 2017. In the eastern region the decline was rather moderate, down by ~7%, while the northern region remained fairly indifferent to the demonetisation policy in terms of cement prices.

Going forward, the government announced new Goods and Services Tax (GST) rates on 18-19 May 2017. A 5% lower tax rate for coal has been welcomed by many, including the cement sector. Despite a 4% rise in the rate applied to cement itself the net effect, when one takes the coal tax into account, is not expected to be particularly significant. However, a leading research agency said that cement companies may go for a price hike to 'mitigate' the increased GST rate.

Egypt: Ordinary Portland Cement prices as of 25 May 2017: Arabian Cement (Al Mosalah) = US$40.33/t; Arabian Cement (Al Nasr) = US$38.83/t; Arabian Cement (Al Nasr) = US$38.83/t; Cemex (Al Muhandis) = US$40.60/t; Cemex (Al Fahd) = US$37.83/t; Building Materials Industries = US$38.00/t; ASEC Cement = US$38.66-39.11/t; El Nahda Cement = US$37.65/t; Wadi El Nile Cement = US$38.11/t; Lafarge (Al Makhsous) = US$39.22t; Medcom Aswan Cement = US$30.00/t; Arish Cement = US$30.00/t; Sinai Cement = US$37.45/t; National Cement = US$38.94/t; El Menya Cement = US$39.22/t; Suez Cement = US$39.38/t; Tourah Portland Cement = US$38.00-39.66/t; Helwan Cement = US$39.66/t; Misr Beni Suef Cement = US$38.55/t; El Sewedy Cement = US$40.21/t; South Valley Cement = US$39.10/t; Misr Cement Qena = US$37.84/t.

White cement prices as of 25 May 2017: Sinai White Cement (Alabid Elada) = US$90.58/t; Sinai White Cement (Super Sinai) = US$88.37/t; El Menya Cement - Royal = US$87.71-89.20/t; Menya Helwan Cement = US$88.10/t.

Blended cement prices as of 25 May 2017: Sinai Cement - Alnakheel = US$36.62/t; National Cement - Altawfir = US$36.62/t; Helwan Cement - Alwaha = US$36.62/t.

Sulphate-resistant cement prices as of 25 May 2017: ASEC Cement (Asic Sea Water) = US$41.32/t; Suez Cement (Alsuez Sea Water) = US$40.76/t; Lafarge (Kaher Albehar) = US$41.04/t; Suez Cement (Al Suez Sea Water) = US$40.60/t; El Sewedy Cement = US$40.49/t.

Honduras: The El Haraldo newspaper reports that prices in the Honduran capital Tegucigalpa are US$9.21/bag (50kg) bag in the past month, whereas cement costs US$8.04-8.74/bag in other areas of the country.

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

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

ASWP = Any safe world port.

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Prepare to obey your robot overlords...

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

Our recent *Global CemPocess Conference* on process optimisation in the cement industry was a bit of an eye-opener (see also Page 22). The event started with a presentation by Jose Favilla of the IBM Industry Academy, ostensibly about 'Industry 4.0 in cement manufacturing.' This concept has been heralded as the next industrial revolution, although it could also be called 'the last industrial revolution,' since after this one, there will be nothing left to improve.

Industry 4.0 will see the rise of cyber-physical systems, which is really just a fancier way of saying 'very sophisticated factories.' Data will be collected from all points in the factory (new cement factories might have 10,000 I/Os) and this data will be fed into increasingly sophisticated control systems that can operate the factories better than any human. This point is critical: the machines will operate the factory more efficiently than any human can, even better than the best operator in the world. When a machine can do this, why would we not hand over the controls and consign our human operators to the scrapheap of history? When a series of fuzzy-logic controls, algorithms, model predictive process control, setpoint-based controls, rule-based logic controls and, yes, artificial intelligence, can be directed at the problem of running a pyroprocess system at its optimum efficiency level, (with no loss in concentration, no tummy-bugs or hangovers, no holidays and no mulling-over of one's mid-life crisis) then it's time for us humans to turn off the lights, pack the fishing gear and go off on a permanent vacation.

Various companies are working on AI, each with their own areas of strength and weakness. At the moment, it is debatable whether there is true machine-based artificial intelligence. Machines have beaten the best chess Grandmasters in the world, have beaten the greatest player of Go (an Asian board game that is even more complicated than chess) and have even beaten humans at Jeopardy - the US TV game show where contestants are presented with answers and must guess the question. Computers can now even look at a book, recognise the words through optical character recognition, and then make sense of the words and sentences themselves, in a process of mining so-called 'dark-data.' Machines now have access to all the knowledge in the world, and perhaps we are lurching towards the moment of 'singularity.'[1] These are all examples of fantastic programming, fast processing, some very smart algorithms and even machine 'learning,' - but are they truly intelligent?

In some ways it doesn't matter. As a reader of *Global Cement Magazine*, you are displaying your intelligence (and, may I say, your good taste). You can do wonderful things that machines struggle to do, like drive a car (oh, they can do that now), land a spaceship (er... they do that too, on a barge, in the middle of the ocean), draw, paint and compose music (ahem, computers do all of these things). Machines now pass the Turing Test - whereby we can't tell whether we're talking to a machine or not.

"Ah," you might say, "but what about the flights of genius that we're capable of, those flashes of inspiration, of intuition, those leaps of logic that humans are so good at. What about that then, eh?" Hmmm. As often as not, these logical leaps are just wrong, based on false rules-of-thumb, incorrect prejudices or 'heuristics' that just don't work (as tediously laid out in the bafflingly best-selling book 'Thinking Fast and Slow'). Some of our human decisions are not so good. For example, look at the state of the world today. It's a mess: humans did this. Our decisions are not always so good.

Jose suggested that increasing automation will allow humans to rise up the 'cognitive value chain' to be able to focus on more challenging tasks. I disagree. It turns out that some of the professionals that are currently among the best paid worldwide, such as doctors, lawyers and accountants, are going to be among the first to be replaced by algorithms. The jobs that are least likely to be replaced are those 'down' the cognitive value chain that require empathy (such as nurses and care-workers) and those that need manual dexterity. It turns out that workers in the giant warehouses that now store all the goods that we order online are more dextrous at picking out of the storage bins the exact goods that are required than the current generation of robots. However, to get the most out of these human 'operatives' a computer-based algorithm tells them exactly what to pick and in exactly what order to pick it in.

In the same way, the robot brain that will soon be operating your cement plant will require human operatives to do its bidding when it comes to finickity maintenance tasks, like tightening the bolts on the foundations of the raw mill, or changing a fuse. Make no mistake though, it will be the computer that will decide if and when that needs to be done, and it will send out instructions for humans to go and do its bidding. Yes, it's best to get ready to obey our robot overlords.

1 https://en.wikipedia.org/wiki/Technological_singularity

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