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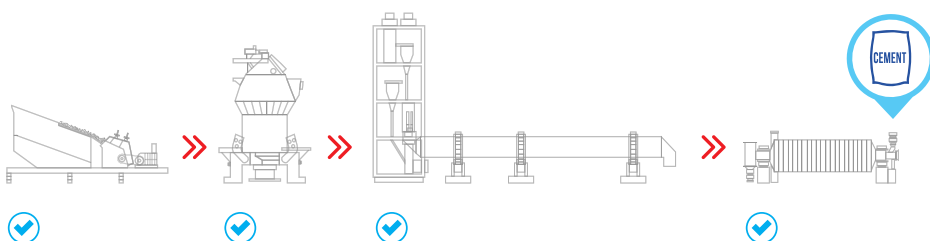
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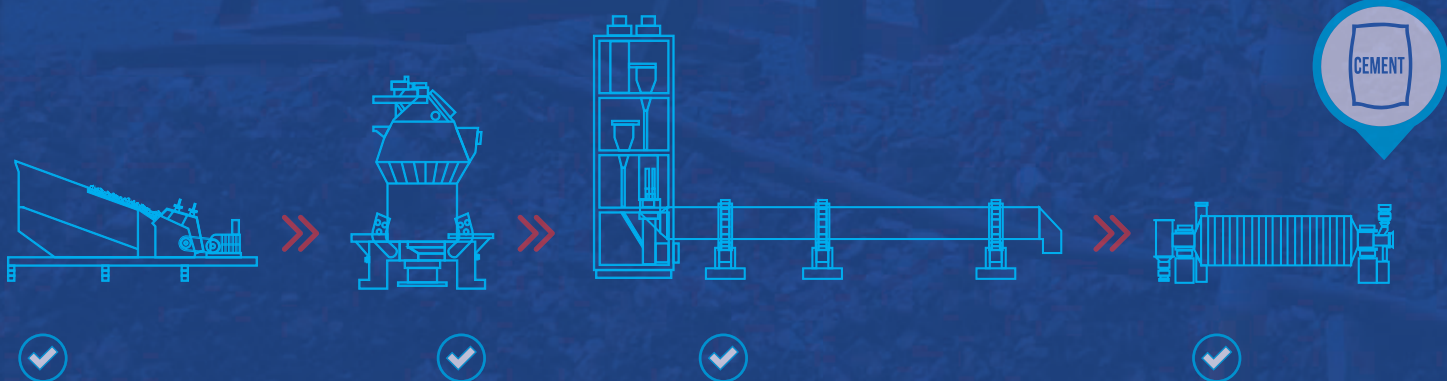


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Dear readers,

Welcome to the December 2017 issue of *Global Cement Magazine* - the world's most widely-read cement magazine! In this last issue of the year, we look at the major events and trends of the past 12 months, as well as the usual mix of the latest news, features and technical contributions.

Summing up the sector in one word this year is challenging but 'consolidation' is a pretty good candidate. Small and medium-sized players have had to face up to overcapacity in a number of major markets. Among the mergers and acquisitions highlighted by David Perilli in his review of 2017 (Page 22) are UltraTech Cement's acquisition of assets from Jaiprakash Associates, CRH's deal to buy Ash Grove Cement in the US, PPC's flirtation with various potential bidders and a merger agreement between China National Building Materials (CNBM) and Sinoma. In addition to these, it has also been reported that 15 larger domestic and foreign firms are interested in the 11.3Mt/yr capacity of Binani Cement in India, which is approaching full bankruptcy proceedings. It may take a while before the Binani and PPC situations are resolved, especially if they experience the same types of delays that the UltraTech / Jaiprakash deal was subject to. PPC at least may have a choice in its future, given a strong improvement in recent results that was reported as we went to press. It has already rejected one offer. Could it be bold and attempt to start a bidding war between CRH, LafargeHolcim and whoever else wants to join in?

As well as our review of the year, this issue brings a summary of the forthcoming *Global Cement Top 100* report, due to be released in the new year (Page 12). The ranking of the top producers and cement producing countries has undergone a fair bit of change since our December 2016 issue, due in large part to the deals listed above. Elsewhere, the issue contains advice for companies taking on staff in the consolidating market, plus technical contributions on drives, gears, electrical harmonics and concrete technology.

We hope you enjoy this issue of *Global Cement Magazine* - the world's most widely-read cement magazine - See you in 2018!

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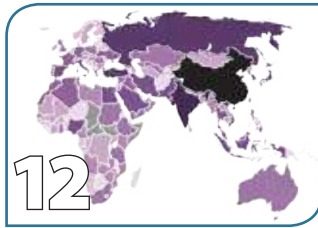


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## Global Cement Top 100 Report 2017-2018

The consolidation of the global cement sector continued in 2017 after a busy 2015 and 2016. CRH has continued to grow, with two major acquisitions in the US. HeidelbergCement, fresh from its acquisition of Italcementi, has bought up Cementir Italia, while assets have also changed hands in South Korea, Germany, Belgium and India. There is also the question of which company will end up with PPC's assets in South Africa. Prior to the release of the final print version of the *Global Cement Directory 2018*, we present a run down of the top cement-producing nations and cement producers as they stand at the start of the New Year.

### Introduction

#### Cement-producing countries and territories

There were 159 countries and territories that produced cement, either in integrated cement facilities or via grinding imported clinker, in 2017, according to the Beta (digital pre-print) version of the *Global Cement Directory 2018*. The cement-producing countries and territories are shown in Figure 1 overleaf, colour-coded by total cement capacity. Between them, they share a total integrated cement capacity of 2.49Bnt/yr, excluding China (for which capacity data is unreliable). Of the 159, 141 produce clinker and 18 countries only grind imported clinker.

For comparison, the comparable data presented in our December 2016 issue showed that there was a total of 158 countries and territories making cement and clinker, with a total integrated and grinding cement capacity of 2.69Bnt/yr, excluding China. Of the 158 countries and territories listed a year ago, 143 produced clinker and 15 only ground imported clinker.

#### Cement-producing companies

The Beta version of the *Global Cement Directory 2018* lists 671 companies that produced cement in 2017 (outside of China), either from integrated plants or grinding plants. Of these, 574 produced clinker and 97 produced cement from clinker obtained from other cement producers.

For comparison, the Beta version of the *Global Cement Directory 2017* listed 659 companies that produced cement in 2016 (outside of China), either from integrated plants or grinding plants. Of these, 582 produced clinker and 77 produced cement from clinker obtained from other cement producers.

#### Cement-producing plants

There are 2087 cement plants listed outside of China in the Beta version of the *Global Cement Directory 2018*, with a further 861 in China. Of those outside of China, 1523 were integrated facilities and 564 were grinding plants. For comparison there was a total of 2021 cement plants listed outside of China

in the Beta version of the *Global Cement Directory 2017*, with a further 803 in China. Of those outside of China, 1469 were integrated facilities and 552 were grinding plants.

### Top 10 cement producing countries

The Top 10 cement producing companies are shown below, listed according to the listed cement capacity provided by the Beta version of the *Global Cement Directory 2018*. The totals include integrated and grinding cement production capacity known to be operating at the end of November 2017. The totals do not include plants under construction, those currently being commissioned or those listed in the directory as 'planned.'

#### 1. China

As for many years now, China was the largest cement producer by installed capacity and production in 2017. The



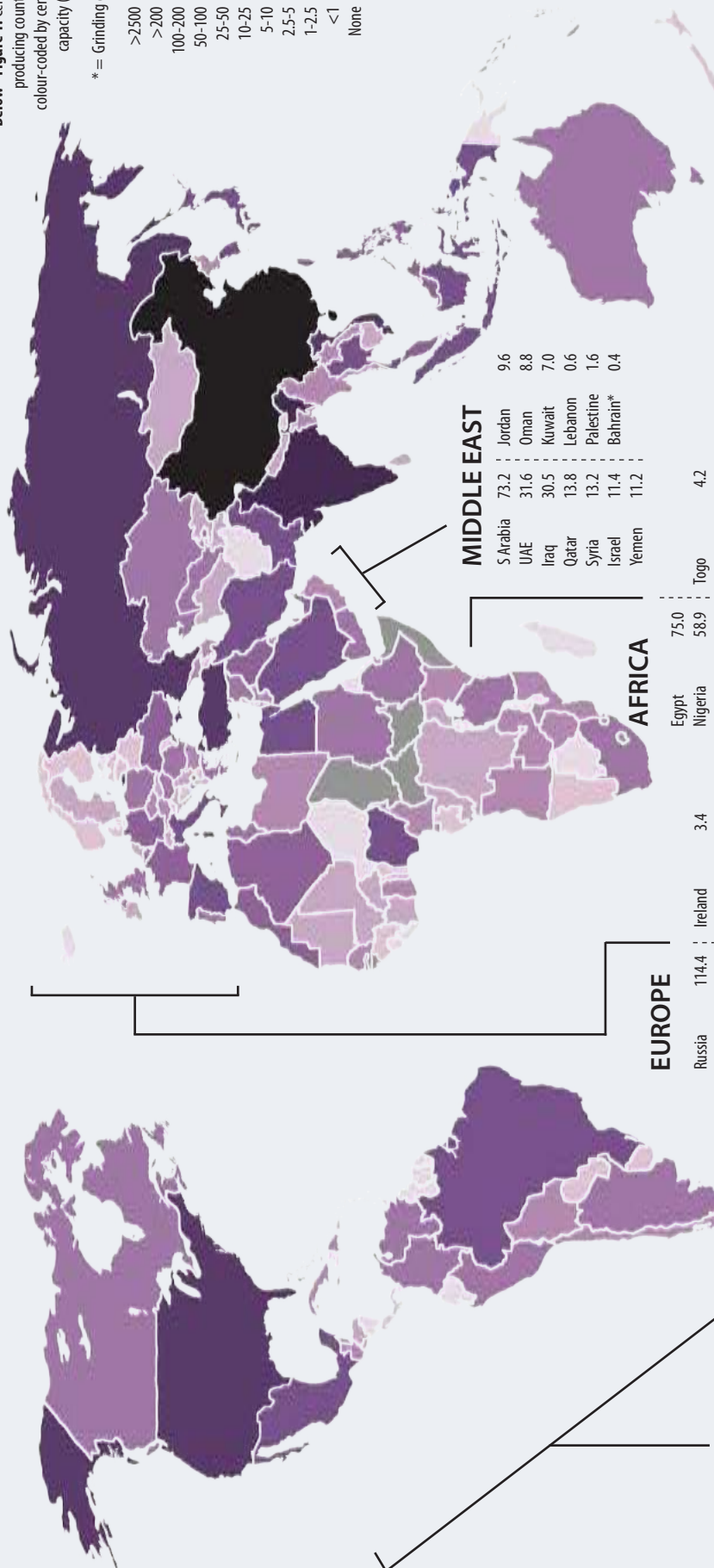
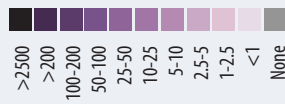
Beta version of the *Global Cement Directory 2018* lists 804 integrated plants and 57 grinding plants, with a combined capacity in excess of 1.5Bnt/yr. However, the sheer scale of the industry and the apparent unreliability of Chinese statistics means that the true capacity is likely to be far higher. The United States Geological Survey (USGS) gives a capacity of 2.5Bnt/yr for China and some sources place Chinese cement production capacity as high as 3.5Bnt/yr. However large it may be, the Chinese cement market is almost entirely dominated by large domestic suppliers, with little influence from established multinational players.

In the first eight months of 2017, Chinese cement production fell by 0.5% year-on-year to 1.5Bnt in the first eight months of 2017. This compares to a rise of 2.5% in the same period in 2016, according to data from the National Development and Reform Commission (NDRC). If extrapolated forward based on the 2.40Bnt of cement produced in 2016, this suggests total production of around 2.38Bnt for China in 2017.



**Below - Figure 1:** Cement producing countries, colour-coded by cement capacity (Mt).

\* = Grinding only.



## THE AMERICAS

USA	120.5	Panama	2.1
Brazil	104.5	Costa Rica	2.0
Mexico	59.1	Puerto Rico	2.0
Canada	18.8	Trinidad & Tob	1.2
Argentina	17.7	Uruguay	1.1
Colombia	16.8	Paraguay	1.0
Venezuela	16.5	Ecuador	0.9
Bolivia	8.8	Nicaragua	0.6
Chile	7.0	Guyana	0.5
Cuba	5.7	Guadelope	0.4
Dom. Rep.	5.4	Martinique	0.4
Guatemala	5.3	Barbados	0.3
Jamaica	3.5	French Guiana	0.1
El Salvador	3.3	Suriname	0.1
Honduras	3.0	Haiti	0.1

## EUROPE

Russia	114.4	Ireland	3.4
Turkey	103.6	Sweden	3.4
Spain	54.8	Croatia	3.1
Italy	54.4	Slovakia	2.8
Germany	36.9	Cyprus	2.7
France	28.4	Serbia	2.7
Ukraine	25.8	Denmark	2.1
Poland	20.3	Latvia	2.0
Greece	16.9	Moldova	2.0
UK	15.3	Norway	1.8
Romania	13.9	Bos. & Herz.	1.6
Portugal	13.3	Lithuania	1.5
Belgium	10.5	Slovenia	1.5
Hungary	10.4	Finland	1.4
Austria	6.3	Macedonia	1.4
Bulgaria	6.1	Luxembourg	1.0
Czechia	5.1	Estonia	0.8
Albania	4.3	Iceland	0.1
Switzerland	4.3		

## AFRICA

Egypt	75.0	Togo	4.2
Nigeria	58.9	Mauritania	3.8
Algeria	38.9	Ivory Coast*	3.7
Morocco	30.0	DRC	3.3
South Africa	21.0	Mali	3.0
Ethiopia	20.7	Rep. Congo	2.8
Tunisia	14.8	Benin	2.3
Sudan	13.0	Guinea*	1.1
Tanzania	13.0	Gabon	1.0
Libya	9.7	Namibia	1.0
Angola	9.6	Malawi	0.9
Ghana	8.6	Liberia*	0.8
Cameroon	8.3	Rwanda	0.7
Senegal	8.0	Niger	0.5
Mozambique	7.5	Botswana	0.4
Kenya	5.2	Eritrea	0.4
Zambia	5.0	Lesotho	0.4
Zimbabwe	5.0	Madagascar	0.3
Burkina Faso	4.7	Burundi*	0.1
Uganda	4.7		

## MIDDLE EAST

S Arabia	73.2	Jordan	9.6
UAE	31.6	Oman	8.8
Iraq	30.5	Kuwait	7.0
Qatar	13.8	Lebanon	0.6
Syria	13.2	Palestine	1.6
Israel	11.4	Bahrain*	0.4
Yemen	11.2		

## ASIA

China	>2500	Uzbekistan	11.9	Nepal	3.3
India	423.0	Kazakhstan	11.7	Kyrgyzstan	3.2
Vietnam	113.8	Bangladesh*	9.8	Armenia	2.1
Iran	88.4	Myanmar	8.4	New Zealand	1.6
Indonesia	73.9	North Korea	8.0	Bhutan	1.5
Pakistan	71.8	Azerbaijan	7.0	Brunei*	0.6
South Korea	70.6	Laos	5.9	Macau*	0.6
Japan	58.5	Georgia	5.2	Reunion*	0.6
Thailand	57.8	Turkmenistan	4.7	Afghanistan	0.5
Taiwan	29.6	Sri Lanka	4.7	Singapore*	0.3
Malaysia	29.6	Mongolia	4.4	N Caledonia*	0.2
Philippines	29.6	Cambodia	4.3	PN Guinea*	0.2
Australia	14.7	Tajikistan	3.9		



As of March 2017, the NDRC was reported to be considering a 10% cut in national cement production. The Chinese state planning body announced on 6 March 2017 that it was pushing to cut production capacity in a number of industries including coal, steel and cement. Cement was slated for a 10% cut in production but the methodology and timescale for this were not clarified. However, large-scale mergers could be in the pipeline and some smaller producers could be forced to close. Some Provinces have already demolished significant numbers of cement plants in order to scale their capacities back towards more appropriate levels.

## 2. India

As in 2016, India was the second-largest cement producer by installed cement capacity in 2017. It had 322.0Mt/yr of integrated capacity across 163 plants, plus 103 grinding plants that contributed a total of more than 101Mt/yr. This gives India a total of 423Mt/yr of cement capacity. The USGS reports that India produced 290Mt/yr of cement in 2016, with figures for 2017 to be published in the New Year.



The Indian cement sector predominantly comprises large domestic players such as UltraTech Cement, Dalmia Bharat and Chettinad Cement. Multinationals are present through locally-branded subsidiaries such as ACC and Ambuja Cements, which are owned by LafargeHolcim.

## 3. United States of America

The United States has a large and well-established cement production base of 120.5Mt/yr in 2017. The USGS states that the US produced 82.9Mt of cement in 2016 from a clinker capacity of 109Mt/yr. The vast bulk is from the country's 97 integrated facilities, two fewer than a year earlier due to continued consolidation.



The US cement market is dominated by multinational producers such as LafargeHolcim, HeidelbergCement, Cemex, CRH and Buzzi Unicem, although some operate through US-branded legacy names such as Essroc (HeidelbergCement). Despite an historic bias towards domestically-owned producers, the US will shortly have none. The last remaining such company, Ash Grove Cement, is to be sold to CRH for US\$3.5bn before the end of the first quarter of 2018.

## 4. Russia

Russia has 114.4Mt/yr of cement capacity, according to the Beta version of the *Global Cement Directory 2018*. According to the USGS, Russia produced 56Mt/yr of cement in 2016, 10.8% down from 62.1Mt in 2015.



The largest producer in the Russian cement market is home-grown Eurocement. A large number of

other local producers also operate, as do selected multinationals such as HeidelbergCement and LafargeHolcim.

## 5. Vietnam

Vietnam was the fifth-largest cement-producing country in 2017 by installed cement capacity, with a total capacity of 113.8Mt/yr. It has 65 active integrated plants and 14 grinding plants. As elsewhere in the Top 10, domestic players dominate the sector. In almost all cases in Vietnam, cement plants are owned or controlled, directly or indirectly, by the government.



The country has a centrally-planned economy, which has struggled to make use of its full cement capacity. This has led to the cancellation of new projects, although some have continued to press ahead despite controversy. A common way to remove the excess capacity has been via exports. Indeed, Vietnam is now one of the most prolific cement exporting countries worldwide. It sold 64.6Mt of cement in the first 10 months of 2017, a rise of 4% year-on-year compared to the same period of 2016, according to the Ministry of Construction. Of the sum, 49.3Mt was sold domestically, a 2% year-on-year rise, while 15.3Mt was exported, a rise of 2%. As of October 2017, Vietnam had 3.3Mt of cement and clinker inventory, mostly clinker.

At present, Vietnam's cement output has reached 86Mt/yr, while domestic demand is estimated at only 60Mt/yr. The country is therefore facing a surplus of 26Mt of cement overall in 2017, according to the Vietnam Cement Association (VNCA).

## 6. Brazil

Brazil's cement sector grew rapidly during the 2000s but has since stopped growing due to its stagnant economy. The cement sector remains large, with 92.9Mt/yr of installed capacity across 75 facilities and a further >11.6Mt/yr from 19 active grinding plants giving a total capacity of 104.5Mt/yr. Production is split between a mixture of local / regional cement producers such as Votorantim and InterCement, smaller domestic players and multinational producers. In 2016 the USGS stated that the country produced 60Mt of cement, suggesting a capacity utilisation rate of around 65%.



## 7. Turkey

Turkey was the seventh-largest cement producing country by installed capacity in 2017, according to the Beta version of the *Global Cement Directory 2018*. Turkey has 52 active integrated cement plants and 95.6Mt/yr of production capacity, according to the Beta version of the *Global Cement Directory 2018*. A further four integrated plants are under construction and five others are undergoing expansion, one



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of which is being relocated. Turkey also has 16 active grinding plants with >8Mt/yr of grinding capacity. (The production capacities of some of the grinding plants is unavailable.) The Turkish Cement Manufacturers' Association (TCMA) claims that Turkey had a total cement capacity of 132Mt/yr in 2016.

Turkish anti-monopoly laws mean that the cement sector has an unusually high number of participants. Most producers are Turkish, although HeidelbergCement, LafargeHolcim and Votorantim are among the multinational players that operate in the market.

## 8. Iran

Iran has a total cement capacity of 88.4Mt/yr across 72 active integrated plants. A further 15 are in various stages of construction or commissioning. The USGS states that Iran produced 53Mt of cement in 2016. The vast majority of plants are domestically-owned, as is typical in the region. However, unlike in some other countries, foreign investment has been further limited in the past due to US-led sanctions.



## 9. Indonesia

Indonesia has 19 active integrated cement plants that share 70.2Mt/yr of cement capacity, plus six grinding plants that contribute an additional 3.7Mt/yr. This gives an overall capacity of 73.9Mt/yr. Nine other integrated cement plants are in the process of being built or are planned to be built. The USGS states that Indonesia made 63Mt of cement in 2016.



## 10. Saudi Arabia

With a total cement capacity of 73.2Mt/yr, Saudi Arabia is the largest producer of cement in the Middle East. It has 21 active integrated cement plants and one grinding plant. The vast majority are locally-owned. The USGS states that Saudi Arabia produced 61Mt of cement in 2016.



## Top 10 cement producers

The Top 10 global cement producers are shown in Table 1, ranked by total cement capacity in the Beta version of the *Global Cement Directory 2018*. The list excludes those from China, which are covered separately overleaf.

### 1. LafargeHolcim

LafargeHolcim, the largest cement producer in the world by installed capacity, is also the youngest in the Top 10.

It was formed in 2015 by combining the bulk of the assets held by the former multinational producers Lafarge and Holcim, both of which had a rich history in the sector.



The Beta version of the *Global Cement Directory 2018* shows that LafargeHolcim has 149 integrated cement plants with a total capacity of 287.3Mt/yr, as well as 57.9Mt/yr of grinding capacity across 71 plants. This gives it a total of 220 plants and 345.2Mt/yr of cement capacity.

## HEIDELBERGCEMENT

### 2. HeidelbergCement

Germany's HeidelbergCement continued to acquire new capacity in 2017 following its major acquisition of Italcementi in 2016. It now boasts 159.3Mt/yr of cement capacity across 102 active integrated facilities and another 26.1Mt/yr from 39 active grinding plants. This gives it a total of 185.4Mt/yr of installed active cement capacity across 141 sites.

HeidelbergCement has started to build its sales revenue following the Italcementi acquisition, with growth in Europe and North America. Its sales rose by 19% year-on-year to Euro13bn in the first nine months of 2017 from Euro10.9bn in the same period of 2016. On a like-for-like basis this rose by 1.1%. Its cement and clinker sales volumes rose by 29.2% to 94.4Mt from 73Mt or by 0.3% on a like-for-like basis.

### 3. Cemex

Despite the growth of UltraTech Cement, Cemex has just held on to



its third place position in this year's Top 100 analysis. At the end of 2017 Cemex had a total of 91.6Mt/yr of cement capacity across 52 active integrated plants and nine active grinding plants. It has a total of 61 plants. Cemex has increased its profit in the third quarter of 2017 due to growing sales and low costs. Its net profit rose by 1% year-on-year to US\$289m in the third quarter of 2017 from US\$286m in the same period in 2016. Sales increased by 2% to US\$3.5bn due to higher cement sales volumes in several markets and higher prices in Mexico and the US.

### 4. UltraTech Cement



With a total capacity of 91.4Mt/yr, UltraTech Cement is the largest Indian producer on the list. It has grown significantly since our previous Top 100 Report due to the acquisition of Jaiprakash Associates' 21.1Mt/yr cement capacity in July 2017. It now has 18 integrated plants rather than 12 and 21 grinding plants rather than 16.

### 5. Votorantim

Brazil's Votorantim has 43 integrated plants that share



60.2Mt/yr of cement capacity, plus 16 grinding plants that add another 10.6Mt/yr. This gives it 70.8Mt/yr of capacity across 59 sites.

Rank	Producer (Origin)	Total		Integrated Total		Grinding Total	
		Capacity (Mt/yr)	Number of plants	Capacity (Mt/yr)	Number of plants	Capacity (Mt/yr)	Number of plants
1	LafargeHolcim (Switzerland)	345.2	220	287.3	149	57.9	71
2	HeidelbergCement (Germany)	185.4	141	159.3	102	26.1	39
3	Cemex (Mexico)	91.6	61	85.0	52	6.6	9
4	UltraTech Cement (India)	91.4	39	52.2	18	21.6	21
5	Votorantim (Brazil)	70.8	59	60.2	43	10.6	16
6	InterCement (Brazil)	53.5	42	42.8	28	10.7	14
7	CRH (Ireland)	50.5	54	41.9	39	8.6	15
8	Buzzi Unicem (Italy)	49.2	37	46.2	31	3.0	6
9	Eurocement (Russia)	47.2	19	47.2	19	0.0	0
10	Dangote Cement (Nigeria)	43.8	12	42.3	10	1.5	2

## 6. InterCement



Number six on the list of top cement producers, InterCement has been buffeted by the poor state of its native Brazilian economy in the past few years. The company operates in Brazil, Portugal, Spain, South Africa, Mozambique, Angola and Argentina, with 53.5Mt/yr of cement capacity across 28 active integrated and 14 active grinding plants.

## 7. CRH



CRH grew rapidly between 2015 and 2016 due to its acquisition of a range of assets from the merging Lafarge and Holcim. It has 50.5Mt/yr of cement production capacity across 39 integrated and 15 grinding plants.

CRH will become even larger in early 2018 when it completes its US\$3.5bn acquisition of Ash Grove Cement in the United States. This will provide an additional eight integrated plants with 7.5Mt/yr of cement capacity. It has also submitted a formal offer for the cement assets of South Africa's PPC.

## 8. Buzzi Unicem



Italy's Buzzi Unicem is the only family-owned cement producer on the list. It has 49.2Mt/yr of cement capacity, with production interests in nine countries in Europe and North America.

## 9. Eurocement



Eurocement is predominantly based in its home nation of Russia, although it also operates in Ukraine and Uzbekistan. It has a total capacity of 47.2Mt/yr, entirely from integrated capacity.

## 10. Dangote Cement



Nigeria's Dangote Cement is Africa's largest home-grown cement producer. It now has a total of 43.8Mt/yr of integrated and grinding cement capacity at 10 integrated plants and two grinding plants in Nigeria, Ethiopia, Tanzania, South Africa, Zambia, Republic of Congo, Senegal, Cameroon and Ghana.


## A note on China

China has by far the largest cement capacity of any nation on Earth. It has some of the largest cement producers and plants, although the difficulty of obtaining reliable data from China means that capacity figures vary widely. We present the *Global Cement Directory 2018* figures for the four largest producers below.

Anhui Conch was  the largest Chinese cement producer in 2017 with 32 cement plants and 217.2Mt/yr of cement production capacity. It is smaller than LafargeHolcim but larger than HeidelbergCement. As well as China it currently has projects in Laos, Cambodia, Myanmar and Indonesia.

China National Building Materials (CNBM) was the  second-largest Chinese cement producer in 2017, with 94 cement plants and 176.2Mt/yr of cement capacity. It is smaller than HeidelbergCement but larger than Cemex. It is in the process of merging with its engineering arm Sinoma.

In 2017  China Resources operated 42 clinker production lines and 91 grinding plants across seven Chinese Provinces, predominantly in the far south and north east of the country. With a total capacity of 79.3Mt/yr, it is smaller than Cemex and UltraTech Cement.

Taiwan Cement is  the fourth-largest Chinese cement producer with around 69Mt/yr of cement capacity.



Rank	Producer	Total	
		Capacity (Mt/yr)	Plants
11	Siam Cement Group	40.3	10
12	Taiheiy Cement	39.8	15
13	VICAT Group	34.9	16
14	Semen Indonesia	29.9	7
15	VICEM	28.8	12
16	Titan Cement	22.8	13
17	Fars and Khuzestan	19.6	13
18	Cementos Argos	18.8	15
19	Dalmia Bharat	17.4	7
20	OYAK Group	16.0	7

**Above - Table 2:** Cement producers ranked 11-20, according to integrated capacity shown in the Beta version of the *Global Cement Directory 2018*.

**Below - Table 3:** Cement producers ranked 21-100, according to the integrated cement capacity shown in the Beta version of the *Global Cement Directory 2018*. \*Ash Grove Cement will be acquired by CRH in 2018.

Rank	Company
21	Arabian Cement
22	Chettinad Cement
23	Southern Cement Company
24	TPI Polene
25	Ramco Cement
26	The India Cements
27	PPC
28	Lucky Cement
29	MASS Global
30	Cementir Holding
31	Limak Holding
32	Shree Cement
33	Sumitomo Cement
34	Colacem
35	Century Cement
36	Tong Yang Cement
37	JSW Cement
38	FNC Venezuela
39	SungShin Cement
40	CIDCO
41	Ghadi Investment
42	Qatar National Cement
43	Mitsubishi Materials
44	SECIL
45	Cementos Portland Valderrivas
46	Hanil Cement
47	North Korean State Companies

Rank	Company
48	JK Cement Ltd
49	Bestway Cement
50	Hyundai Cement
51	Cementos Progreso
52	Ash Grove Cement*
53	Tamin Cement
54	JK Lakshmi Cement
55	Kesoram Industries
56	Yemen Corporation
57	Tehran Cement Company
58	UNACEM
59	Cimento Nassau
60	UBE Industries
61	Wonder Cement
62	Arkan Çimento
63	Southern Province Cement
64	Yamama Saudi Cement
65	Nesher Cement
66	Prism Cement
67	Orient Cement
68	ASEC
69	Aşkale Çimento
70	Yanbu Cement
71	Nuh Çimento
72	Novorocement
73	Cooperativa La Cruz Azul
74	Emami Cement

Rank	Company
75	Çimsa Çimento
76	Misr Cement Qena
77	Northern Cement Company
78	Kohat Cement
79	Vissai Group
80	Sibirsky Cement
81	Ahlia (Arab) Cement
82	Elementia
83	Schwenk Cement
84	Al Khalij Cement
85	Reliance Cement
86	Penna Cement
87	YTL Cement
88	Binani Cement
89	Cementos Pacasmayo
90	Mugher Cement
91	Martin Marietta Materials
92	Raysut Cement
93	Tokuyama Cement
94	Afrisam
95	Cementos Avellaneda
96	Nirma
97	Asia Cement
98	PT Gama Group
99	Grupo Cementos Chihuahua
100	AS Çimento

## Cement producers 11 - 100

The cement producers that rank 11th to 20th according to integrated capacity in the Beta version of the *Global Cement Directory 2018* are shown in Table 2, along with their total cement capacities and numbers of plants. The remainder of the Top 100 is shown in Table 3. The capacities of these will be shown in the full *Global Cement Top 100 Report*, when it is released in 2018.

## Cement producers 101-574

The remainder of the global cement producers will also be listed in the *Global Cement Top 100 Report*. The smallest integrated players, 565 - 574 are shown in Table 4. These 'Bottom 10' have just 0.59Mt/yr between them, compared to the more than 1Bnt/yr of the Top 10.

A breakdown of how cement capacity is spread among cement producers (integrated capacity only) is shown in Figures 2 & 3. While the Top 10 have around 1.01Bnt/yr of capacity, producers 11-20



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**Right - Table 4:** Cement producers ranked 565-574, according to the Beta version of the *Global Cement Directory 2018*.

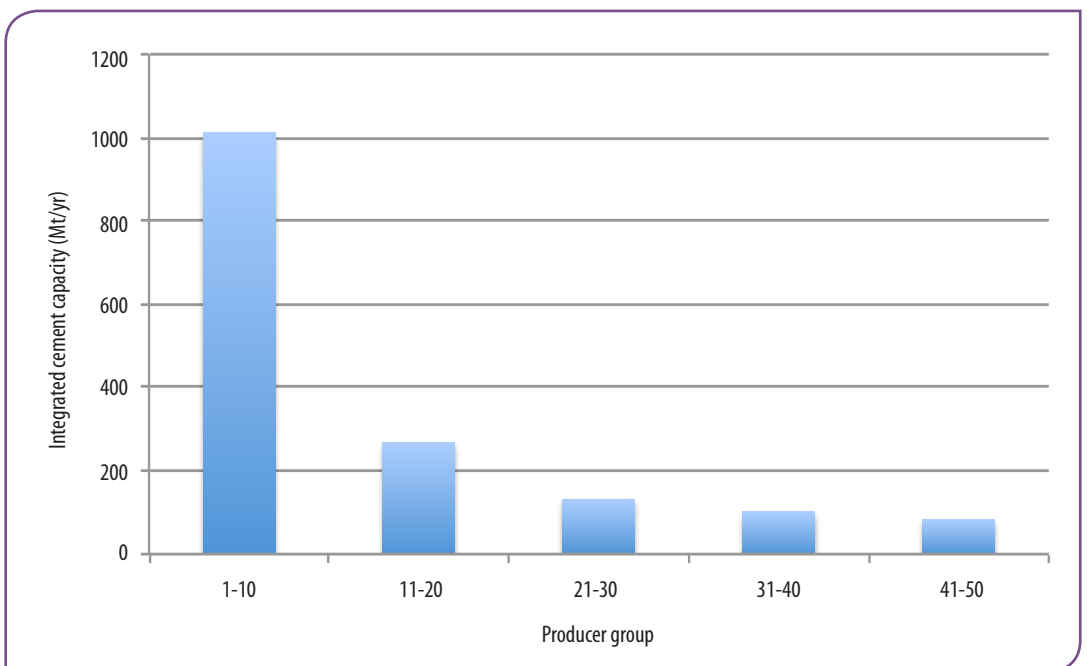
have just 268.3Mt/yr. The next three groups of 10 have 132.1Mt/yr, 102.0Mt/yr and 82.9Mt/yr respectively. Producers 51-100 hold 286.6Mt/yr, with the remaining 474 producers holding just 643.8Mt/yr.

## Global Cement Top 100 Report & Global Cement Directory 2018

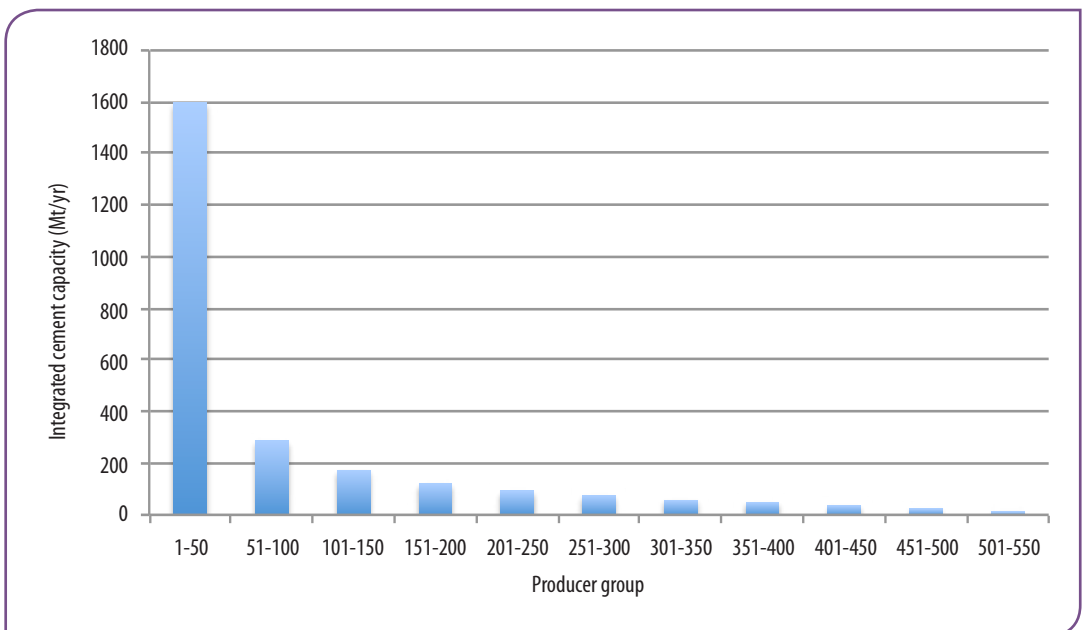
The information in this summary has been obtained from the Beta version of the *Global Cement Directory 2018*, which is currently undergoing review by the industry prior to the publication of the final print version in early 2018. The *Global Cement Top 100 Report* will be published in January 2018.

Rank	Producer	Total	
		Capacity (Mt/yr)	Plants
565	Empresa Minera Industrial	0.1	1
566	Fiji Industries	0.1	1
567	Arab Co for White Cement	0.1	1
568	Himal Cement	0.1	1
569	X18 Factory Cement	0.1	1
570	Jabal Saraj Cement	0.03	1
571	Keer	0.02	1
572	Maruti Cements	0.02	1
573	Objedinennie	0.01	1
574	Pancharatna	0.01	1

**Right - Figure 2:** Breakdown of integrated cement capacity held by Top 50 cement producers.



**Right - Figure 3:** Breakdown of integrated cement capacity held by 550 cement producers.



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David Perilli, Global Cement Magazine

## The global cement industry in 2017

The big theme of the cement industry in 2017 has been the drive by producers to merge and the battle afterwards to squeeze value from the resultant entities. The motivator to this is a world awash with clinker, alongside a number of depressed construction markets. Government interaction in this kind of environment becomes critical and many major markets have been buffeted by state decisions both for the better and worse. The process is not complete but already recovery is coming to long-depressed markets like Europe. Here *Global Cement* presents some of the major stories and trends from the year.

### The incredible contracting cement industry: mergers and acquisitions

Major mergers and acquisition in 2017 included UltraTech Cement's acquisition of assets from Jaiprakash Associates, CRH's deal to buy Ash Grove Cement in the US, PPC's flirtation with various potential bidders, a merger agreement between China National Building Materials (CNBM) and Sinoma, consolidation between various companies in Italy and the merger between refractory manufacturers RHI and Magnesita. All of the above are potential game changers for the companies involved and the markets in which they operate.

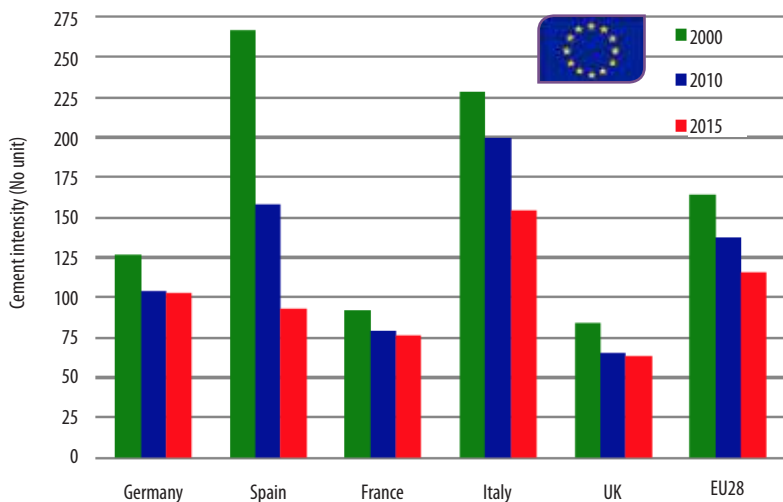
UltraTech Cement's purchase was a long time coming but it finally completed its US\$2.5bn asset purchase from Jaiprakash Associates at the end of June 2017. The move saw it increase its number of integrated cement plants in India to 18 from 12 and its cement grinding plants to 21 from 16. Its overall cement production capacity rose by nearly 40% to 91.4Mt/yr from 66.3Mt/yr. The company has become the fifth largest cement producer in the world, although it is almost exclusively based in India.

If UltraTech had a hard time reaching its happy ending, deals to buy Ash Grove Cement in the US and PPC in South Africa have had similar teething troubles. CRH's deal to buy Ash Grove, the largest domestically-owned player in the US, came seemingly out of nowhere. Then, CRH nearly got gazumped by a rival bid from Summit Materials. It's unclear how serious the bidding war actually was given the large disparity in size between CRH and Summit Materials. However, it was certainly a surprising turn of events before Ash Grove approved the merger agreement with CRH. In the end CRH agreed to pay US\$3.5bn to buy eight cement plants across eight US states, combined with ready mix concrete, aggregates and associated logistics assets in the midwest.

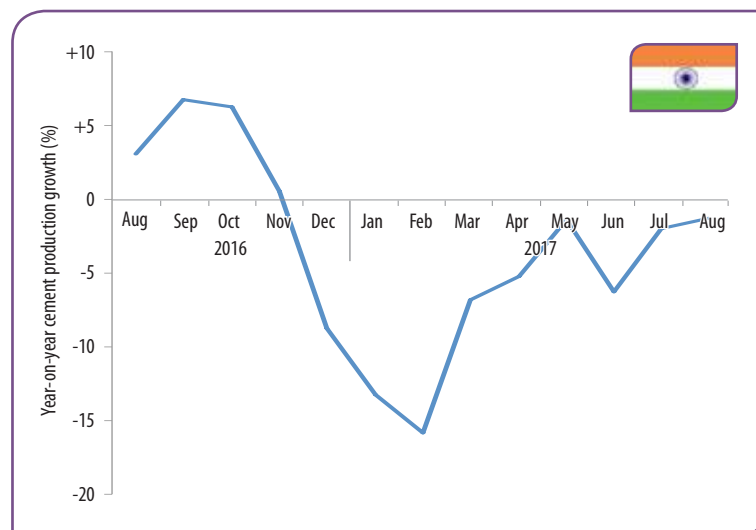
This was nothing, however, compared to the protracted bidding process that is still going on for South Africa's PPC. A financial company, Fairfax Financial Holdings, kicked off the bidding in September 2017 with a low offer of US\$154m for a 21% stake in PPC, with a condition that it merge with its local rival AfriSam. The two South African cement producers have been engaged in a 'courtship dance' for years about a potential merger. PPC has since been shouting out about every other potentially-interested party - including LafargeHolcim, CRH and Dangote Cement - during an offer evaluation period. Given PPC's portfolio of production sites across sub-Saharan Africa, the prize for winning the auction is immense.

Consolidation in the Italian market marks an interesting phase in the recovery of the European cement sector. After several tough years in the domestic market, Austria's Wietersdorfer & Peggauer picked up a plant in Cadola from Buzzi in 2014. Then Germany's HeidelbergCement bought Italcementi, and Cementir purchased Sacci in 2016. Buzzi Unicem agreed to buy Cementizillo for Euro60m plus shares in Buzzi Unicem in June 2017. HeidelbergCement's subsidiary Italcementi then followed this with a deal to buy Cementir Italia from Cementir Holding for Euro315m in September 2017.

**Below - Figure 1:** Cement intensity of the construction sector in Europe, 2000-2015.  
**Source:** CEMBUREAU calculation based on EUROSTAT and EUROCONSTRUCT data in Activity Report for 2016.



The merger agreement between CNBM and Sinoma is part of China's state-mandated policy to reduce its number of cement companies and this is covered in more detail below. Finally, refractory giants RHI and Magnesita completed a merger at the end of October 2017, signifying that equipment and material suppliers are subject to the same economic forces as the cement industry that they serve.



**Left - Figure 2:** Monthly cement production growth rate year-on-year in India. **Source:** Ministry of Commerce & Industry.

## The (European) empire strikes back

All of the purchases in the Italian cement industry suggest that the sector is finally taking serious action to fight a drastic change to its market. Figure 1 shows that the cement intensity of the construction sectors in Italy has dropped significantly since 2000, suggesting that the mode of construction has moved from new projects to patching up old ones. Throw in the financial crash in 2007 and, strikingly, cement production in Italy fell from 49Mt in 2006 to 21Mt in 2015. CEMBUREAU, the European Cement Association, reckons that consumption fell year-on-year by 4.7% in 2016 in the country, with a further drop of 3% forecast for 2017. In short, Italian cement assets may have reached a floor price, triggering the round of acquisitions we have witnessed.

Across the border though, France is very much back in business. Cement consumption started to rise in 2016 after several years of decline and the Syndicat Français de l'industrie Cimentière (SFIC) expects this to continue growing up to 18.1Mt in 2017. All the major producers have agreed that the market is reviving and investments have returned with a number of projects, including a new clinker production line at LafargeHolcim's Martres cement plant and a number of smaller projects like Ecocem France's order of a Loesche mill for a slag cement mill that it is building in Dunkirk.

Elsewhere in Europe, HeidelbergCement described its Southern European territory as having the, '...best market conditions for almost 10 years,' with cement volumes rising modestly and Germany and Spain doing well.

## Production in a clinker rich world

Looking at the wider world, excess production capacity was a major factor in 2017, with reduced production in many of the major cement markets. Most of them have reported falling production year-on-year for the first half of the year, apart from China and Vietnam, two countries with highly managed

economies. The former's cement sales rose by 1.6% to 1.1Bnt, according to National Bureau of Statistics data, although the growth rate is slowing. The latter's production rose by 4.7% to 40.1Mt during the first half of the year.

The Chinese government says it has 'fixed' the imbalance between supply and demand, through peak-shifting production and industrial 'self-discipline.' This has resulted in steadily rising cement prices. Part of this 'self-discipline' involved shutting down obsolete production capacity. The amount of new clinker capacity added was expected to fall by 50% to 5.4Mt/yr in the first half of the year. Peak-shifting means stopping production at selected plants for up to five months (!) over the winter, currently at least as far as 2020. Exemptions are in place, including ones for plants that co-process alternative fuels.

India has been suffering from problems since the government's demonetisation policy broke the back of production growth in the autumn of 2016. As can be seen in Figure 2, the monthly cement production growth rate was negative year-on-year from December 2016 until August 2017, according to Ministry of Commerce & Industry data. This was followed by the

**Below:** There has been an even larger glut of clinker in 2017 than in 2016, prompting a spate of new grinding plants and terminals in growing markets.

**Source:** Krzysztof Burek, Caspi Cement, Kazakhstan.





Cement Manufacturers Association (CMA) saying that the industry was sitting on 100Mt/yr of excess production capacity in September 2017. All of this is reflected in a 7.7% drop in production to 142Mt in the first half of the year.

The rest of the major markets are interesting, not least because there has been a real split since early 2015 between Russia and Brazil and the rest of the larger producing nations such as the US and Turkey (See Figure 3). Cement production has fallen slightly in the US by 1.2% to 35.8Mt in the first half of 2017 but consumption is still expected by the Portland Cement Association (PCA) to keep growing in 2017 and 2018, although at a lower rate than previously expected. Ed Sullivan, the PCA's chief economist summed up the industry's dilemma at the *IEEE-IAS/PCA Cement Conference 2017* by saying, "Trump's policies will impact cement... But we don't know what they are!"

Brazil, meanwhile, continues to suffer with falling production and sales. Production fell by 6% to 26.7Mt in the first half of 2017 and sales have been steadily dropping too. However, Paulo Camillo Penna from the Brazilian cement association SNIC commented on the September 2017 data that the rate of decline was slowing compared to 2016 and that further progress was expected in 2018.

## Coping with all that clinker

As Ad Ligthart of Cement Distribution Consultants commented at the *Global CemTrans Conference* in June 2017, it does not make sense to build a new integrated cement plant within 200km of a port: imported cement or clinker is a much more cost-effective solution. He then went on to explain the importance of a plant's utilisation factor for its profitability and how this inevitability causes surplus production. This has

led to an explosion of terminals and grinding plants in 2017.

The rise of modular or portable clinker grinding plants, produced by companies like Spain's Cemengal, has been one response to this. Equipment producers like Gebr. Pfeiffer and Loesche have brought out their own variants on the concept. The idea has really taken off in 2017, with SCB International's pilot for a ground blast furnace slag (GBFS) micro-grinding mill and even similar concepts for the gypsum wallboard industry. One of Ligthart's examples was the Grindmax concept from Humboldt Wedag, in which a Handymax ship incorporates a number of ball mills to grind raw materials that come in by water.

## Multinationals set the new normal

From the multinational producers the big comparison in 2017 has been between LafargeHolcim and HeidelbergCement. LafargeHolcim has been coping with the aftermath of its merger between Lafarge and Holcim in 2015 as it attempts to downsize itself into profitability. Although the French legal investigation into Lafarge's historic behaviour in Syria was the headline cause for the resignation of former chief executive officer (CEO) Eric Olsen, the group's struggles post-merger are also likely to be a factor. The new boss Jan Jenisch has a big 're-boot' job ahead.

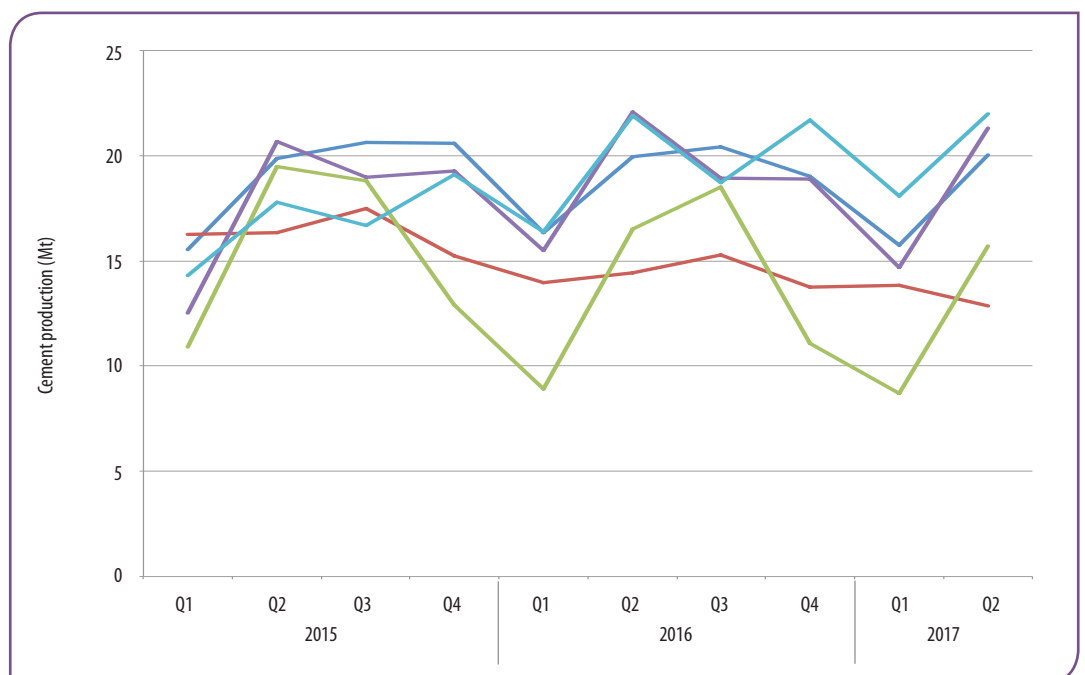
HeidelbergCement is behind LafargeHolcim in the merger process, as it bought Italy's Italcementi in late 2016. Its headline figures seem great. Yet, on a like-for-like basis, revenue and sales volumes are barely growing, possibly suggesting trouble ahead. HeidelbergCement should at least be spared the boardroom shenanigans that LafargeHolcim saw.

This stagnation can be seen in the results of the other, smaller multinational producers with a global spread. Cemex is an example of this (See Figures 4

**Below - Figure 3:** Quarterly cement production for the US, Brazil, Russia, Turkey and Vietnam from Q1 2015 to Q2 2017.

United States  
Brazil  
Russia  
Turkey  
Vietnam

**Sources:** United States Geological Survey, Sindicato Nacional da Indústria do Cimento, Federal State Statistics Service of Russia, Turkish Cement Manufacturers' Association, General Statistics Office of Vietnam.



& 5). UltraTech Cement should be about to benefit from its acquisition of 21.2Mt/yr cement production capacity from Jaiprakash Associates in June 2017. For the moment though it is suffering from falling profits due to rising fuel costs. Further down the list of producers by production capacity, performance depends very much on location. For example, the comparative fortunes of producers in Brazil like Votorantim are different from those in the Philippines like Eagle Cement.

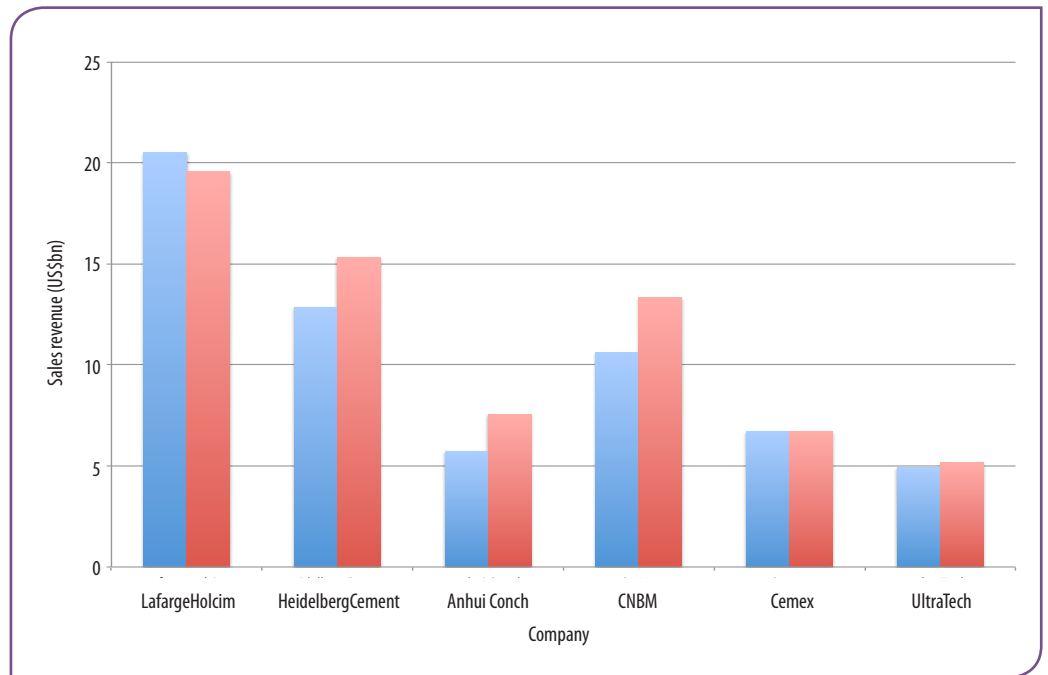
China, in effect, has rigged the profits for its major cement producers through peak-shifting production and other measures. The price of cement and company sales revenue bottomed out in 2016 and then the government initiatives kicked in. Both CNBM and Anhui Conch are looking at sales revenue bounces of over 20% so far in 2017.

## What about 2018?

Despite falling cement production, uncertainty in many markets and slow sales growth for the multinationals, the future is looking bright. The bane of global cement companies was previously being involved in too many 'dodgy' markets simultane-

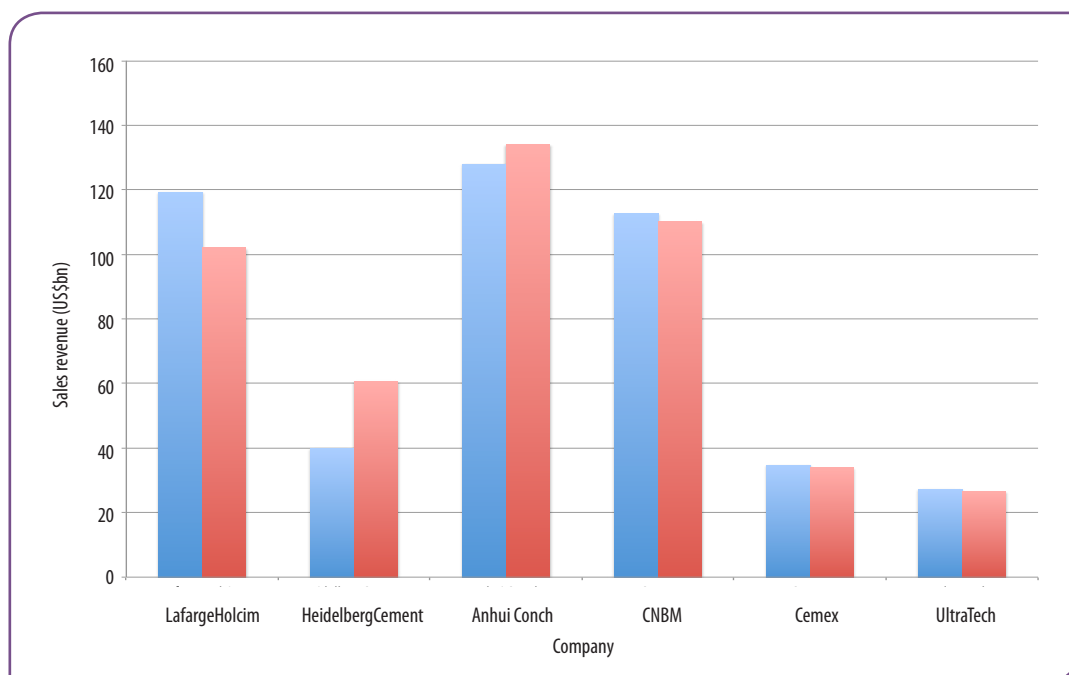
ously. Yet with Europe recovering, South America doing well in places, the US holding a growth path (even if it is lower than anticipated), Pakistan surfing a construction boom, Africa's ever-present economic growth and other countries doing well, the natural advantage of global players that hold a wide geographical spread of assets is gradually returning. Toss in the frenzy of merger and acquisition activity that has been going on with the swingeing synergy savings that follow and change is coming. Or at least that's the theory. As the quote sometimes attributed to physicist Niels Bohr goes, "Prediction is very difficult, especially about the future."

**Above - Figure 4:** Sales revenue for major cement producers in the first, second and third quarters of 2016 and 2017.



■ 2016  
■ 2017

Sources: Company financial reports.



**Above - Figure 4:** Cement sales volumes for major cement producers in the first halves of 2016 and 2017.

■ 2016  
■ 2017

Sources: Company financial reports.



Oxana Bristowe, [OxanaBristowe.com](http://OxanaBristowe.com)

## A view on recruitment and careers in the global cement industry

Since the end of the Second World War, cement production has grown into a huge global industry. The *Global Cement Directory 2017* details over 2200 integrated cement plants and 500+ grinding plants worldwide that can produce around 4.2Bnt/yr of cement. But growth brings challenges. There are profitable and unprofitable cement plants. Overall return on capital isn't high and overcapacity is a major factor in certain markets. Consolidation is now well-established, with the chairman of the World Cement Association recently expressing the view that a return to profitability will require even more consolidation in the future.



**Above:** Oxana Bristowe is an international executive search consultant and coach with cement industry experience. She is MD of [OxanaBristowe.com](http://OxanaBristowe.com)

Every company is different - current situations are shaped by the visions of the founders, the history, culture and values. Boards and management teams must therefore plan for future success in their own unique way. At [OxanaBristowe.com](http://OxanaBristowe.com), our view is that successfully meeting the challenge of commercial competition and external pressures such as reducing CO<sub>2</sub> emissions and improving profitability requires some changes in approach. Important questions that cement industry leaders should ask include: What kind of people will help us be successful in the future? How we can attract and develop them? How can we retain them?

As for how the industry can recruit the right people, we think there are three ways. Consolidation and re-organisations, major themes at the moment, typically free-up talent and can open up new opportunities. Another source of talent is other sectors. Using subcontractors is a third, indirect, approach. Of course, the development of existing resources to release their potential is always important.

We have seen people joining cement from other sectors and making strong contributions, with management talent coming from the mining and metals,

fast-moving consumer goods (FMCG), industrial manufacturing, oil and gas services and professional services industries. This is perhaps unsurprising - similarities of geographical focus, core processes, commercial activities and corporate functions facilitate inter-sector moves.

Commodity sectors such as oil and gas and mining and metals are inherently cyclical. In the down-cycle they can release talent for other sectors. However, they will aggressively recruit in the up-cycle. Cement companies need to monitor the broader economy, taking advantage of these cycles. Timing is key.

One example of an inter-sector move was a rapidly-expanding regional cement player that appointed a new senior finance manager. His background was in private and listed companies in the FMCG, food and beverages and mining and metals sectors. He brought exceptional skills, experience and personal qualities from corporate finance, multi-country and multi-company operations. His impact was reflected in strong financial results, increased company visibility to international investors and strategy implementation.

**Right:** The Jinping-1 dam in Sichuan, China. The two Jinping dams generate an amazing 8400MW of green energy. China is one of the main countries responsible for growing cement consumption so far in the 21st Century.





**Left:** London's iconic Barbican estate - from a pre-green era.

Taken to the limit, the result is a 'virtual' company directly employing little more than its directors.

A survey into outsourcing practices in the cement industry has revealed that it is quite widely used - not just for general services but for operational activities including quarrying, maintenance, logistics and production. Three broad approaches were identified: 1. Subcontracting mainly general services; 2. Extending that to encompass operations, and; 3. Further extension to perhaps 75% of company activities. There appear to be regional factors influencing such decisions.

Such changes shift traditional in-house functions to external suppliers. No work disappears as such. However, such operators require specialist resources within the company reducing its in-house functions. These include economic, costing, risk assessment, control system and post-implementation review specialists. The long-term success of outsourcing, in individual cases, significantly depends upon appointing the right subcontractors and implementing rigorous cost and quality controls.

Finally, the cement industry needs people who can shape its future and create value. Looking to that future, leaders need to be aware that younger workers that they currently employ seek fulfillment, appreciation and being part of a greater goal, rather than just job security.

## Staff: Know your strengths

What about the effect of consolidation in the cement industry on the careers of people working in the sector? It can certainly bring out fears, confusion and negative mental states. However, taking a proactive approach to one's career, knowing one's unique talents and strengths and developing effective communica-

Another example is of a young and talented man in his mid 30s who moved into cement management from oil and gas operational management, bringing very strong international experience. He doubled the capacity of one of the company's cement plants and then initiated a benchmarking study to identify potential cost reductions, monitor competitors and increase sales performance. Subsequently promoted into CEO roles, he has successfully led many major achievements.

In a third example, OxanaBristowe.com recently helped select a CEO to turn around a failing investment in the mineral sector. The CEO was experienced, motivated and determined and quickly built a supportive team. Great success followed within just 18 months, attracting a takeover bid of over US\$2bn.

Elsewhere, functional managers in IT, HR, Legal and Tax have also brought key skills and experience from other industries into cement.

Outsourcing is an indirect source of talent. It is a major feature in the oil and gas and building sectors, with many key functions often subcontracted.



**Left:** Don't just brush up your CV / résumé, conduct an annual career review.



tion at all levels are keys to success and will help you to stay in charge of your destiny. Here we outline seven key points...

**1. Develop a plan:** First of all you need to decide to take full responsibility for your career success. Responsibility - and 'response ability.' This is very relevant in the current consolidation climate. It means being proactive in career management at all levels, not just management and executive levels.

I don't recommend starting by dusting-off one's CV / résumé and updating it. Instead, initiate a 'career review.' This should ideally be an annual event. It encompasses: Where are you today? What is working and what isn't working? Is there anything you could do better in your job? Are you growing and learning or are you stagnating?

The next step is thinking about how your next job might look. Get as much detail as possible. Connect your future goals to your emotions. How would you feel if you achieved your goal? Don't forget to integrate your career goals with your overall life goals. There is no point winning career success but not having overall happiness in life. A career review also involves developing broader perspectives of developments in the cement sector and the global economy, which can be instructive in themselves.

**2. Get clarity on your unique selling point (USP):** It is important to have clarity about your USP. Whether looking for a job, finding yourself with a redundancy package or competing for a role post-merger or restructuring, knowing your worth is crucial. We are all unique and knowing your USP helps with positioning, confidence and communication.

**3. Identify and address limiting beliefs, fears and obstacles:** The psychology of career development and job-search is the most challenging part of the process. What internal conversations do you have with yourself? Do they support your goals or hinder growth? This is one of the key areas addressed in coaching. It is very difficult, if not impossible, for a person to do

this on their own. Remarkable results can be achieved when mental blocks and inner conflicts are resolved.

**4. Develop confidence in the future:** It is often said 'being made redundant was the best thing that happened to me.' However, to anyone facing the loss of a job, through consolidation, cutbacks or reorganisations, such sentiments can sound very hollow. Thinking through what might happen in such a situation and having a plan to deal with it, really is important. Could one survive on a partner's income for 12 months until another position is found? How would credit card debts and the rent / mortgage be handled? Once the fear of those things has been removed through a workable strategy, the job search challenge becomes the focus.

**5. Present yourself effectively:** Does your CV / résumé effectively communicate your career achievements and clearly describe why you are suitable for your ideal job? Many managers have CVs that present them very poorly. Most of us are weak at describing ourselves in an effective, confident and concise manner that really grabs an interviewer's attention. I have worked with coaching clients in this area with great results, proving it was poor presentation that had been holding them back. I strongly recommend having an effective profile on social media platforms such as LinkedIn.

**6. Develop your network:** A common difficulty that senior managers and executives experience when working on their career goals is their very limited networks. Often, they have been too busy doing their jobs to develop one properly. Deliberately building a network of contacts is part of career management and development. People who are good at developing strong connections in different fields of life expose themselves to a far greater number of opportunities over the course of their career.

**7. Be a star, not a grey mouse:** Make yourself noticeable! Proactively seek to develop and present yourself, your skills and experience to make you really stand out from the crowd.

## Summary

In conclusion, as executive search consultants and executive career advisors we see exciting times and great opportunities ahead for the global cement industry. With the right approach, challenges can bring major career opportunities and tremendous commercial benefits. We wish you every success!



**Right:** Consolidation in the cement sector is moving fast. How will you work out your next move?

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Lukas Steiner, Wikov Industry

## Planetary or helical?

Planetary or helical? This is often a question when speaking about price for a gearbox, maintenance costs, compact size and reliability. There are many prejudices and plenty of opinions too. Whatever the solution, many in the cement industry want to make their plants more efficient, both to save money and to hit sustainable development goals (SDGs). Here Wikov Industry presents its stance...

In short, the answer to the title's question must be simply 'planetary.' Planetary gearboxes are compact and occupy much less space than helical ones, while providing high power density. For many cement industry applications, selecting a helical gearbox automatically leads to high power drives in horsepower terms. The larger drive the more you pay for the steel. The compactness as a property of a planetary gearbox means a smaller weight, meaning (along with the size) a reduced demand for foundations. These facts can also help to justify the often higher acquisition costs for a planetary gearbox compared to a helical one. I used the term 'often' but perhaps I'd better use 'sometimes.' In fact, planetary gearboxes can cost less than a comparable helical gearbox in certain circumstances. It is dependant on the right choice of a gearbox supplier and a precise technical specification from the cement plant.

Parallel shaft gearboxes in different arrangements are a mainstay of the global cement industry. They are being improved by using the latest computer aided engineering (CAE) tools, the newest design standards, high-strength materials as well as manufacturing methods. However, radical improvement in terms of size and weight is limited, as significant material strength improvements (e.g. aerospace specification) would mean unacceptably higher costs.

Helical gearboxes, from a design perspective, are reaching their limits. There seems to be no feasible revolutionary innovation of a helical gearbox design that would allow an increase in its power density as well as efficiency, which are key parameters nowadays. At the same time, the required torque is reflected in the size of the helical gearbox. They are large and the internals are large too. Larger internals for given speed means higher velocities, higher friction and thus higher losses. The larger parts and greater weights translate into higher costs for the material. This becomes topical in case of replacement when gears or bearings become worn out. This happens faster than with a properly designed planetary gearbox.

Planetary gearboxes represent a very robust solution with an excellent power-to-weight and size ratio. Gearbox durability is maintained at the same level or even increased, while the overall size and weight are significantly reduced. There is a clear cross-industrial trend for a shift from parallel shaft gearboxes to planetary ones, as those can offer reduction in terms of size, weight and cost with no compromise in the performance.

However, the cement industry is fairly conservative. It can take a long time to convince it of the benefits of a new technology. The resistance for change does not push towards identifying new solutions and benchmarking them against traditional technologies. This is understandable and represents a very comfortable attitude for the cement plants. It can also be perceived by plants that the maintenance staff who repair the helical gearboxes are familiar with the technology, so the service costs *must* be lower. If we speak about maintenance costs alone, this may be true on a case by case basis. When speaking about life-cycle costs, however, this attitude may lead to big mistakes. Mere calculations of the savings achievable by increased efficiency are completely self-explanatory (See Table 1).

Planetary gearboxes are well suited for the central drives of ball mills. However the majority have historically been fitted with very large helical gearboxes. These helical gearboxes are wide-spread, known by the operators and maintenance staff but, as nothing

**Below - Figure 1:** Multi-satellite planetary stage of the Wikov Orbi-flex gearbox during assembly.



Motor power (kW)	2000	
Daily operation (hr)	24	
Annual operation (days)	300	
Electricity price (Euro/kWh)	0.114	
Gearbox type	Helical	Planetary
Gearbox efficiency (%)	95.05	96
Annual power consumption (kWh)	14,400,000	14,263,200
Total annual costs	1,641,600	1,626,005
Difference / Year (Euro)	15,595	
Savings after 10 years	155,950	

lasts forever, they eventually become worn-out. The apparent ideal solution often appears to be replacement of rotating parts. Casing and bearing housings can be reused and there is no engineering needed. It can be carried out in a reasonable timeframe without loss of cement production. However, the price for the spare parts that match the gearbox brand can exceed 165% of the price for a planetary solution from an alternative manufacturer. Additionally, the new gearboxes certainly offer better warranty conditions to those provided for replacement parts.

### Further technical advantages

Apart from the size, weight and efficiency parameters mentioned above, there are other design aspects that make a planetary solution the more appropriate choice. Coaxial input and output shafts have the same sense of rotation on high and low speed shafts. It means that the offset between the gearbox and motor and thus larger package space is eliminated. Coaxial execution is more reliable.

Even load distribution on gear teeth in comparison with helical gearboxes can be considered as another user benefit if we speak of the use of a flexible pin in a planetary stage. This is subject to the application and other specifics of the operation. When a flexible pin planetary stage is used, extra flexibility in the specially-designed pin allows the planet to float under load in a limited manner. By the nature of the pin design (double-cantilever arrangement), the planet stays parallel to both sun and annulus (ring) gear. Equal planet bearing load sharing, as well as even gear contact pattern, is achieved for vari-



**Left - Table 1:** A comparison of helical and planetary gearbox power costs.

**Left - Figure 2:** A carrier with flexible pins during assembly of a planetary gearbox Orbi-flex.

ous loads, including overload. Both gear and bearing life are significantly improved as the load is always equally spread. The risk of failure is significantly reduced. This results in their extended lifetime and savings on operational expenditure.<sup>1</sup>

### References

1. Steiner, L. 'A fresh wind for the cement industry,' in *Global Cement Magazine*, September 2016.

**Below - Table 2:** Advantages and disadvantages of helical and planetary gearboxes.

	Helical	Planetary
<b>Advantages</b>	<ol style="list-style-type: none"> <li>1. Proven conventional solution;</li> <li>2. Better service access to the internals.</li> </ol>	<ol style="list-style-type: none"> <li>1. Compact dimensions and lower weight: <ul style="list-style-type: none"> <li>• Smaller foundation;</li> <li>• Easier handling during installation / repair;</li> </ul> </li> <li>2. Higher power density;</li> <li>3. Increased reliability means less frequent service;</li> <li>4. Lower power consumption;</li> <li>5. Lower oil consumption;</li> <li>6. Longer gear life at similar loads;</li> <li>7. Coaxial: No offset output shaft.</li> </ol>
<b>Disadvantages</b>	<ol style="list-style-type: none"> <li>1. Larger and heavier;</li> <li>2. More expensive foundation;</li> <li>3. Higher installation/on-site handling costs;</li> <li>4. Lower efficiency;</li> <li>5. Higher power consumption;</li> <li>6. Higher oil consumption;</li> <li>7. Parts are larger and replacement parts are more expensive;</li> <li>8. Very sensitive to the alignment;</li> <li>9. Shorter gear life;</li> <li>10. Offset between the gearbox and electric motor, thus larger package space required.</li> </ol>	<ol style="list-style-type: none"> <li>1. Cooling: worse heat dissipation due to smaller surface area;</li> <li>2. Noisier operation;</li> <li>3. Worse access to the planetary stage internals in case of no horizontal split line in the gearbox casing. This can be adjusted by the gearbox producer.</li> </ol>



Len Eros, ABB

## A new impetus for gearless conveyor drives

Gearless conveyor drives (GCDs) have been available for over 30 years, but are now receiving a new impetus. Here Len Eros, Global Mining Manager for the Robotics and Motion division in ABB, explains how, with a medium power solution that uses low voltage permanent magnet motors.



**Above:** Len Eros is the Global Mining Manager for the Robotics and Motion division in ABB.

Gearless conveyor drives (GCDs) are a favourite topic among conveyor engineers since relatively recent improvements in technology mean that they now offer increased tangible advantages. Using a GCD eliminates the necessity for gearboxes, which increases system efficiency, while reducing maintenance requirements. This is accomplished by using a large, low-speed synchronous motor coupled directly to a drive pulley. This enables direct transmission of the high forces produced by the electrical machinery without any kind of fluid coupling or gearbox.

The motor is controlled by a variable speed drive (VSD) to produce a motor shaft rotational speed of typically 50-70rpm. There are usually several drive modules in a drive station and there can be multiple drive stations on the conveyor. With existing GCD technology, the motors have ranged typically around 2.5-7MW, with a total connected power in the range of 5-20MW.

The concept is not new, given that the first GCD installation was at the Prosper Haniel mine in Germany in 1985. It is still in operation today. While this installation proved the viability and robustness of the design, it was not commercially cost effective. However, the introduction of the ST10000 steel cable belt helped to address this. The belt has the strength to use the high power input from these drives, greatly increasing the capacity of the conveyor. This can result in longer belts, heavier loads or higher lifts, all using a single flight of belt where multiple flights would be needed with conventional systems.

### Improved reliability and efficiency

The elimination of numerous mechanical and electrical components increases reliability while improving the efficiency of the overall conveyor system by several percentage points. At the same time, the maintenance requirements of the GCDs are substantially lower than a conventional drive system. Further, the gain of 2-3% in the efficiency of high power systems represents huge savings in electrical costs over the life of the installation.

The technology used for GCDs is the same that is used for mine hoist drive systems. In fact, the operating conditions in mine hoist applications are much more demanding than in overland conveyor applications. This is because with a hoist, the number of start and stop cycles is significantly higher and the application is characterised by frequent changes between motor and regenerative operation.

The chief drawback of a GCD has been that its capital costs are significantly higher compared to conventional geared designs until the individual power modules reach ratings above 3-4MW. As a result, it has only been cost competitive in high power drive designs with reasonably long operating lives. There are only a handful of systems operating globally. All of these, with the exception of the Prosper Haniel system, have been installed in the past five years. The result is that potential cement industry customers for this technology are not yet confident in the design concept as they naturally want to see a larger installed base that has more running time.



**Right:** Schematic of a low voltage GCD.

## New GCDs using low voltage permanent magnet motors

Recognising that many customers could achieve significant benefits from the GCD technology if it is cost competitive in smaller and more common applications, ABB has developed a new approach to the gearless conveyor drive system. This uses high-efficiency low voltage permanent magnet motors in place of the medium voltage synchronous motors. The initial power ratings for these motors are in the 900kW to 2MW range, which means that the new GCDs are applicable to a very large number of new and retrofit drive systems. By using a low voltage drive, the cost is competitive with conventional geared systems for this power range.

This pioneering GCD concept is lightweight and compact and can be used with either air or liquid cooling methods. With this concept the motors can be foot mounted if desired but shaft mounting the motor provides an easy alignment method and a quicker installation. The shaft mounted design also reduces the concrete foundation requirements. The heavy-duty design is robust enough to deal with shocks and vibrations associated with cement industry conveyor applications and its IP66 rating means it is completely protected from dust and water contamination. An added benefit is that the GCD will lower operational noise levels.

### GCDs offer significant advantages

Compared to geared options, a negligible extra investment in a GCD solution for medium power conveyors offers these significant advantages:

- Operational cost savings (OPEX);
- Energy loss reduced by over 30%;
- No monitoring and testing of gearboxes;
- >50% higher reliability and improved equipment utilisation, leading to lower production losses;
- Faster return on investment.

### A practical example of convincing cost benefits

The following example demonstrates how the new GCD can reduce operational costs for cement industry conveyor systems. It is based on the following conveyor system design:

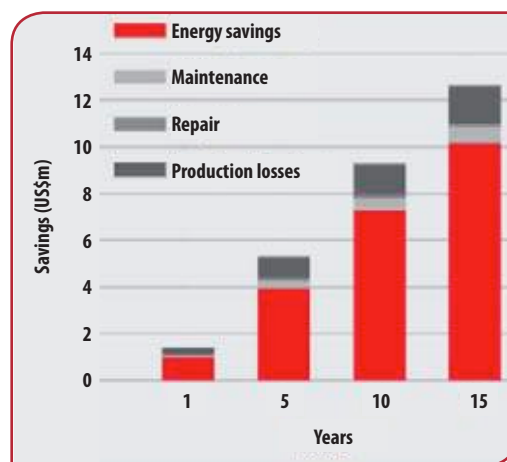
<b>Conveyor line:</b>	Four flights
<b>Drives:</b>	12 drives in total
<b>Power:</b>	1000kW
<b>Tonnage:</b>	8800t/hr
<b>Energy cost:</b>	US\$0.10/kWh
<b>Gearbox efficiency:</b>	96%
<b>Annual operation time:</b>	6900hr




**Left:** Pilot low voltage GCD installation based on permanent magnet motors.

The results are presented in Figure 1, which shows the cumulated cost savings (including investment) after one, five, 10 and 15 years of a conveyor system equipped with GCD compared to the same system with geared drives.

The major cost factors are electric energy, system maintenance, repair and loss of production. The four pillars show the saved cost for each time frame. It is obvious that savings in electric energy and lower loss of production are most significant. After 15 years, a mine would have saved about US\$12m by using the GCD.



### Summary

Despite their many benefits, the uptake of GCDs has so far been slow in the cement sector. With the capital cost of medium voltage drives and synchronous motors limiting the number of applications where GCD technology could be cost competitive, it is easy to understand why the current installed base is low. However, with a new approach that uses low voltage variable speed drives and permanent magnet motors, the benefits of GCDs are now available to a wide range of new and retrofit medium power cement conveyors. In applications in which increased energy efficiency, reduced maintenance requirements and improved reliability are important, ABB's medium power GCDs should be considered. 



Dave Brassard, New Technology Solutions

## CoolCure Concrete: An innovative and sustainable solution

Portland cement, in addition to being a large user of energy in processing, is the number two emitter of CO<sub>2</sub> in the world today. For many years there have been no major advancements in concrete technology that have optimised its use or its chemistry. In an effort to increase sustainability and address the environmental impact of this dilemma, New Technology Solutions (a subsidiary of Silicone Solutions) has developed its patent-pending CoolCure, a major development that could potentially change the global market and productivity footprint of concrete technology.

CoolCure is a new technology that significantly reduces or even eliminates the heat of hydration in concrete structures. It is an admixture that converts the behaviour of any typical cement into that of a CEM IV low-heat cement. Innovative benefits of this environmentally-responsible product include ~80% less heat and typically 50% greater compressive strength in large pour concrete structures. Major increases in working and placement time are also enabled. Via the use of advanced technology, a more balanced stoichiometry and nanotechnology, CoolCure believes that this new technology has the potential to change the face of concrete technology.

CoolCure works by balancing the chemistry. This minimises byproducts and results in a more efficient reaction. While creating a more efficient reaction, more bonds are created that generate more strength. Increases in strength of 40-100% have been realised.

The heat is reduced by minimising the generation of calcium hydroxide byproduct. Its exotherm is well known in the sector. The calcium hydroxide generated is better utilised by creating more reinforcing CSH bonds, instead of creating troublesome heat.

### Current concrete pour methodology

Modern mass pours of concrete in which the width of concrete is around >1m and 25cm thick, require intensive cooling plans due to the gross exotherm generated as calcium hydroxide forms and is wetted out during the cure. This expands the concrete during the cure and cracks may appear upon cooling.

However, traditional cooling techniques can be unsuccessful at mitigating all heat management problems. Strength reductions, material shortages and unsuccessful thermal plans have resulted in many industry issues. Excessive energy is used for

**Right:** CoolCure is an admixture that can allow any cement to act like a CEM IV low-heat cement. It offers environmental, safety and strength benefits, among others.



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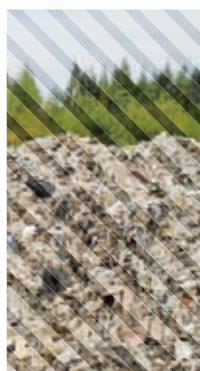
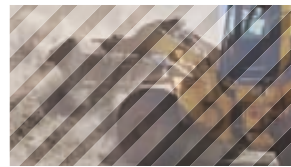
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**Right:** A sample showing the interior and exterior of CoolCure concrete.



cooling in pours for bridges, dams, embankments and other facilities. Concrete is often scrapped due to large cracks, as well as exceeding placement and maximum temperature designs. Problems are also seen in 'flat work' with concrete, ranging from slab curls, thermal cracks, internal stresses and distortion from differential thermal cooling. CoolCure can be used to eliminate all of these issues.

Silica fume and other silicas are currently used to increase strength. However, they do not reduce the heat of hydration. Cure retarders are also well-known to increase working time/delivery range. However, these do not increase strength or eliminate the excessive heat that causes the problem. CoolCure combines these benefits while eliminating the problems.

Reducing the amount of Portland cement in the concrete mixture is also a way to reduce the exotherm. However, significant time intervals (60-120 days) are required to attain full strength. This delay is inconvenient and costly for most applications. Supplementary cementitious material such as slag and fly ash are also often used to reduce the amount of Portland cement.

### **CoolCure concrete pour methodology**

CoolCure is ideal for large mass pours and can be implemented in existing cement mixing facilities and trucks. Its eco-friendly composition simply balances the chemical reactions to minimise the formation of calcium hydroxide and the resultant heat generation.

At the same time it increases compressive strength.

CoolCure also greatly reduces the potential for delayed alkali-silica reaction (ASR). This occurs whenever concrete pH exceeds 12.5 and some of the Portland cement is not fully wetted-out in the mix. A conventional concrete pH is typically 12.5-13.5. CoolCure's pH is 12.4. CoolCure fully wets the Portland cement. The reduced delayed ASR leads to a longer usage life.

### **Green benefits**

CoolCure offers a number of advantages over traditional Portland cement-based concrete. It offers a reduced CO<sub>2</sub> footprint and eliminates the need for cooling, resulting in lower energy costs while pouring. It does not require fly ash or slag and can use less Portland cement to achieve an equivalent strength. The concrete produced is less porous, there is no cooling aggregate, bleed water is eliminated and there are reduced energy and construction costs.

### **Safety benefits**

CoolCure is a safer solution for those working with it than with Portland cement. Wet Portland cement is caustic and those in contact with it are at risk of chemical burns and developing skin problems. CoolCure does not burn the skin. Other safety benefits include less airborne silica and potential for injuries due to less relief cutting. The concrete produced is fire- and freeze-stable, meaning that there can be no explosive spallation. There need be no handling of dry ice, liquid CO<sub>2</sub> or liquid nitrogen, all potentially risky tasks for site personnel.

Additionally, cure speeds can be customised upon request as CoolCure offers 'cure-on-demand' technology variations that can speed up or slow down the curing process to meet the end user's specific applications needs.

### **Conclusion**

Cement plants are a significant source of sulphur dioxide, nitrogen oxide, and carbon monoxide, which are associated with a myriad of health and environmental impacts. Reducing the environmental footprint of Portland cement during production and usage to meet future emissions regulations is of paramount concern to all concrete producers.

The CoolCure chemical cure system represents attaining a higher level of technology in practice, while obtaining a progressive leap forward is achieving a more environmentally-friendly cement that has a higher overall sustainability. These capabilities result in a very green product that will be needed in the future. We view CoolCure as a major step forward in concrete pour technology.





Kayhan Sezer, Mardin Çimento (OYAK Group)

## The effects of harmonics in electrical energy in the cement industry

In the cement industry, processes and equipment are significantly affected by the quality of electricity. One of the negative effects on power quality is the presence of harmful harmonics. Here Kayhan Sezer from OYAK Mardin Çimento explains the risks and remedies.

The main reason for the formation of harmonics is the use of nonlinear circuit elements in electric circuits. The harmonics of these circuit elements arise from the nonlinearity of the relationship between voltage and current. The main sources of harmonics in cement factories are: transformers; static converters; generators; gas discharge lamps; computers, and; uninterruptible power supplies. Let's look at each in turn:

**Transformers** are the most important elements of the power system in cement factories. They cause harmonics because they are made up of iron core bobbins. Since the magnetisation characteristic of the iron core is not linear, the transformers go to saturation and produce harmonics. The operation of transformers outside the nominal value causes the nucleus to be more satiated. Saturation causes a rapid increase in the level of harmonic currents.

Transformers in cement plants usually have two types of harmonics. These harmonics are current harmonics and voltage harmonics. Additional Joule losses occur due to the high harmonics flowing in the current circuit. Core iron losses increase. This leads to magnetic effects in the communication circuits. The effects of voltage harmonics increase the dielectric strength, leading to electrostatic effects on the communication circuits. It causes resonance between the inductance of the transformer and the capacity of the transformer-connected consumers. These effects are undesirable.

**Static converters:** Cement factories use cyclical controls in many applications, including in fans and drive

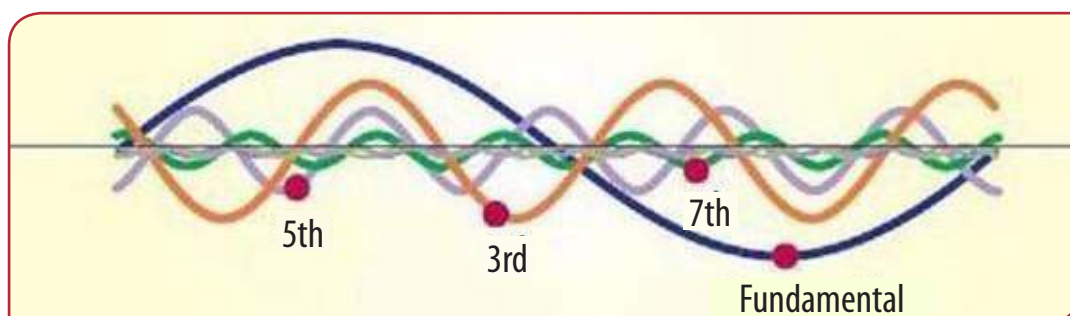
motors. Generally, rectifiers, inverters and frequency converters are harmonic sources. These devices produce harmonics because they work with electronic switching principles. A major harmonic source is one-phase and three-phase converters. DC transmission systems, batteries and photovoltaic systems are fed via converters. The advantage of a three-phase converter in a phase converter is that it does not generate the three and three-fold harmonics.

The harmonic components produced by an ideal converter are given by...

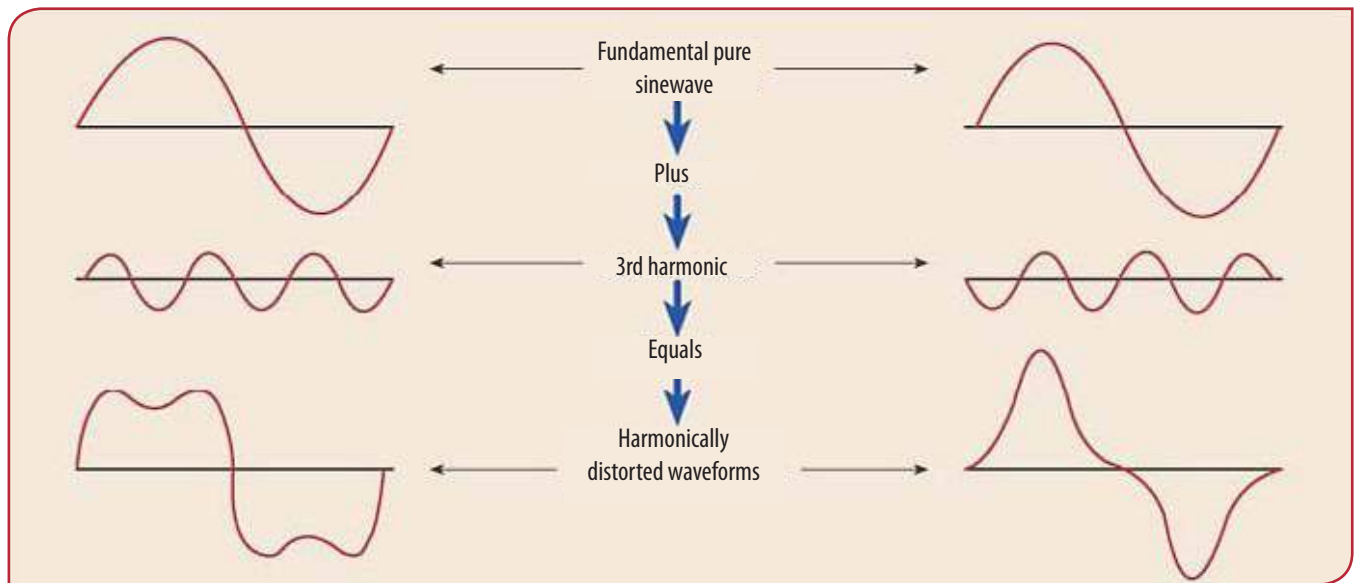
$$n = (kp) \pm 1$$

...where p = number of pulses; k = any number from 1 to infinity; n = the harmonic order. Thus, three pulse rectifiers produce all harmonics except the three and three folds. Six pulse rectifiers produce the 5th, 7th, 13th, 17th, 19th, 23rd, 25th, and so forth. 12 pulse rectifiers lead to 11th, 13th, 23th, 25th, 35th, 37th and so forth. In general, six pulse rectifiers are used in industrial plants.

**Generators:** Cement factories use generators at certain power levels in case of a power failure. These generators produce harmonics that depend on the number of machine and armature grooves. Generators produce harmonics either due to saturation of the shape and magnetic circuit or due to magnetic resistance change. For these reasons, it is preferred that the Y-connector of the generator windings and the Y-connected point be isolated. If the generator is connected to a four-conductor network, then the neutral line is connected to an artificial Y-connected



Left - Figure 1: The harmonics components.



Above - Figure 2: Harmonically distorted waveforms.

point created by a zigzag-connected coil. After proper selection of the stator winding steps, the third and fourth harmonics in the field curve by the beaming method can be completely removed from the voltage curve in the 5th and 7th harmonics. At this point the lowest harmonic is the 2nd harmonic.

**Gas discharge lighting:** Cement factories have significant consumption values for lighting, some of which are on 24/7 and some of which work only during office hours. The fluorescent, sodium vapour lamps, and xenon gas discharge lamps used in plants cause harmonic currents to be drawn from the network. The electronic ballasts used in compact fluorescent lamps are also important harmonic sources.

**Computers:** As elsewhere, computers are used almost everywhere in cement factories. Computer systems are both harmonic generators and are themselves highly influenced by harmonic components.

**Uninterrupted power resources:** Cement plants use uninterruptible power supplies where producers do not want our systems to be interrupted. Uninterruptible power supplies work by switching the alternating voltage to true tension, storing the energy and then turning the alternate current with the aid of the inverter to switch the consumer to the instantaneous interruption. Harmonics occur on both the rectifier side and the inverter side at the output.

In general, rectifiers are devices that convert an alternating voltage to a true voltage. If the elements used are uncontrollable elements, such circuits are uncontrolled rectifier circuits.

### Effects of harmonics on the system

Harmonics in cement plants affect all elements in the power system. For this reason, power systems are adversely affected by this situation. Harmonics deform the voltage and current waves. The effects include:

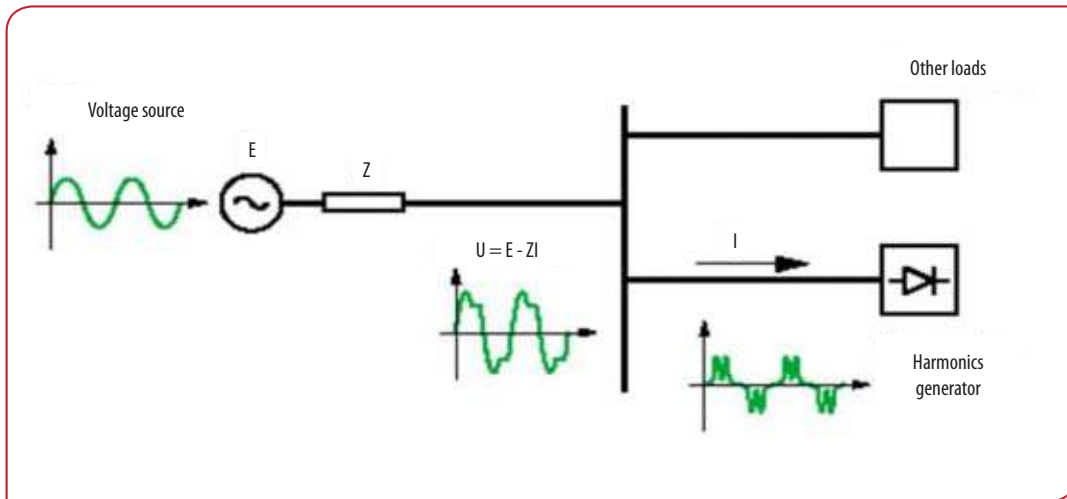
- Increased losses in equipment in the energy system;
- Overheating of transformers;
- Torque oscillations and the formation of overheating in rotating machinery;
- Increase in voltage drop;
- Damage to generator and mains voltage waveform;
- Excessive reactive loading in compensation plants;
- Incorrect measurements in induction type meters;
- In-line resonance events, excessive voltages and currents caused by resonance;
- Operating disturbances in control circuits;
- Penetration of dielectric material;
- Incorrect operation of microprocessors;
- Interference and abnormal operation in audio and video communication devices;
- Changing of power factor.

### Reducing the effects of harmonics

The harm caused by the harmonics in a cement plant should be solved firstly by good design and, if they cannot be designed out of the system, by correcting elements connected to the circuit. These circuits, which are connected to the circuit where the non-linear elements are located and which remove the desired harmonic components, are called harmonic filters. The filters are divided into two groups as passive and active filters. Passive filters consist of passive elements such as ohmic resistance, capacity and inductance. The purpose of passive filters is to provide the resonance of the inductance and capacitance elements at the frequency value of the harmonic component to be eliminated. Active filters eliminate harmonics by measuring the harmonic current produced by nonlinear loads and by generating a harmonic current at the same amplitude in the opposite phase.

### Design precautions

Some precautions may be taken at the beginning to remove the harmonic components. These measures



Left - Figure 3: Generation of distorted waveforms.

are taken during the manufacture of circuit elements or the design of their connection to the system.

**Precautions in generators:** In synchronous generators the shape of the magnetic field in the air gap determines the induced electromotive force. If the magnetic field is sinusoidal, the induced electromotive force will also be sinusoidal. In round-rotor synchronous machines, two thirds of the pole gaps are wound to approximate the sinusoidal curve of the non-sinusoidal field curve, or a different type of winding is used.

**Precautions with converters:** Measures taken in the transformers used in cement plants provide great benefits. If the number of pulses in the rectifier is  $p$ , the harmonic order is found by the formula  $n = kp \pm 1$ . In this formula,  $k = 1, 2, 3, \dots$  are exact numbers. By increasing the number of pulses, it is possible to remove small-order harmonics. Since the converters have  $n = 5, 7, 11, 13$ , the harmonic currents  $I_5 = I_1 / 5$ , and  $I_7 = I_1 / 7$ . Therefore, the larger the number of pulses, the smaller the harmonic order.

**Precautions in transformers:** In the high capacity transformers used in cement factories, the greatest benefit is obtained from the iron core by keeping the magnetic induction value large. However, in the case of large induction value, harmonic components in the magnetising current increase due to saturation. The best measure to reduce the harmonic components of the magnetising current is to keep the magnetic induction low.

**Passive filters:** Passive filters are placed between the source and the receiver, destroying harmonic components outside the fundamental frequency. In passive filters, the aim is to ensure that the L and C components resonate at the frequency value of the harmonic component to be passed. Passive filters can be connected to the circuit in series and parallel.

**Serial filters:** Serial filters are connected in series between the harmonic source and the networks (See Figure 4). They exhibit a high impedance to the harmonic flow. Therefore, the series filter has high impedance at the set frequencies. Since the serial filter is set to a specific frequency, it only shows high impedance to that set frequency component.

Serial filters are common in applications where the 3rd harmonic is dominant in the single-phase system in series filters. In series filters, the fundamental frequency usually shows low impedance. The major disadvantage of the series filters is that they are insulated for line voltage with the necessity of carrying the load current. However, there is no resonance problem with the series filters.

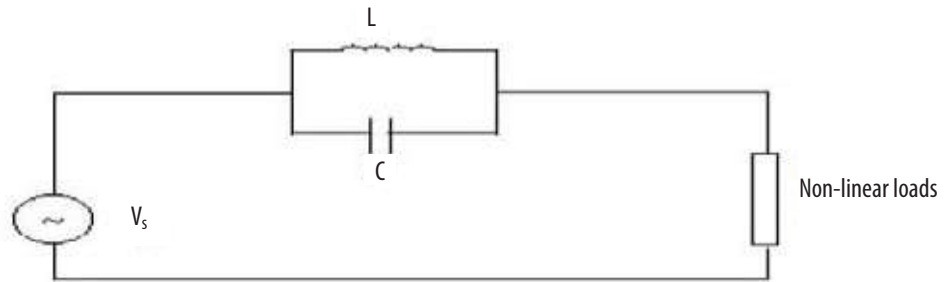
**Shunt (parallel) filters:** Shunt filters are connected in parallel to the harmonic source (Figure 5). A low impedance is obtained at the desired harmonic frequency and undesired harmonic currents are applied to the ground. Shunt filters are designed to exhibit a very low impedance to harmonic currents. Shunt filters can also be used to correct the power factor. Like serial filters, shunt filters are only effective at the frequency they are set to. At OYAK Mardin Cement factory, this application has been used to great effect.

**Active filters:** Another method that can be used to prevent harmonics in cement plants is the use of active filters. The operation of the active power filter is based on the principle of injecting a current of the same amplitude but opposite phase to the harmonics produced by the system load. Power electronic elements are used. Basically, the active power filter consists of a standard converter connected to the network by a digital controller. There is an additional control block to define the harmonic distortion in current or voltage. Active filters are less dependent on source impedance than passive filters. Only the controller must be reprogrammed during load changes. Active filtering is a more expensive method than other methods.



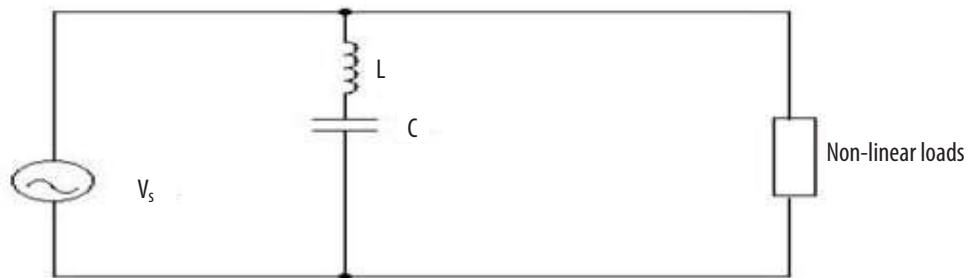
**Right - Figure 4:** Schematic of a series filter.

$V_s$  = Voltage  
L = Load  
C = Capacitor



**Right - Figure 5:** Schematic of a shunt filter.

$V_s$  = Voltage  
L = Load  
C = Capacitor



The active power filter consists of three parts: A converter; A current control circuit and: A harmonic detection block. Figure 6 shows the principle diagram of the active power circuit.

In order to ensure that the energy plant operates reliably and steadily, harmonic quantities introduced by nonlinear elements or nonconsecutive sources during design and operation must be calculated or measured.

## Conclusion

Care must be taken that nonlinear loads do not reso-

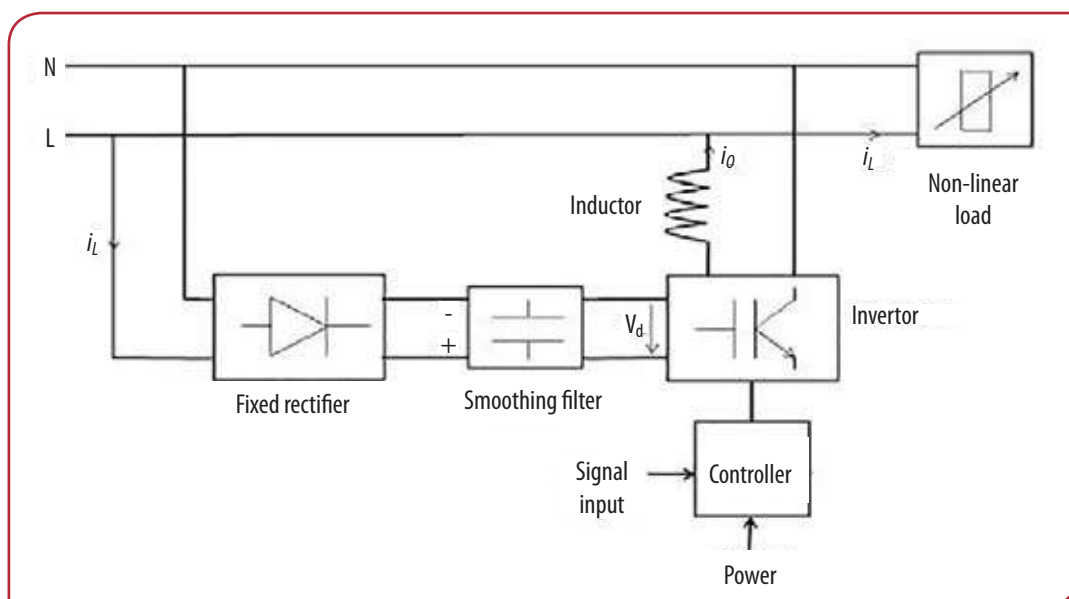
nate with the harmonic power system that is causing them. Resonance conditions must be calculated separately for each harmonic component. In the case of harmonics injected into a power system from harmonic sources, they affect the network in such a way that it will resonate with any component. Higher order harmonics can affect the entire system. These effects reduce the performance of the power system and other equipment.

OYAK Mardin Cement factory has acted to prevent harmonics from being formed and reducing the damage they cause to the system. An appropriate

harmonics removal method must be used in the industrial facilities for the construction of the plant. The energy cost of the harmonics can be reduced by the improvement ratio. Conversely, the rate of polluting the energy network can add an additional cost to consumers. In this way, it will be possible to obtain higher quality, safer and more economical electrical energy.



**Below - Figure 6:** Schematic of a series filter.




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## Germany: BEUMER bag-in-bag: Film packaging protects paper bags from the environment

**B**EUMER has launched its new bag-in-bag system, which quickly and reliably packs filled paper bags individually or in groups with a weather-resistant plastic film. This protects the contents against moisture, dust, insects and other environmental influences during storage and transport. The BEUMER bag-in-bag is easy to integrate into existing filling and packaging systems.

The impermeable film keeps dust from escaping from the filled bags and prevents product losses. The films have thicknesses of 30-100 microns, so material costs are low. The outer packaging in the paper bags does not re-

quire an intermediate layer made of PE, a fact which also cuts costs and increases filling performance. The highly efficient system is so reliable that ultrasonic welding of the bags is usually not necessary.

The BEUMER bag-in-bag, offered to customers in co-operation with Tentoma, has a wide range of uses. For the BEUMER Group the focus is on packaging of bags, but the technology is also suitable for goods with lengths of up to eight metres and product circumferences of 600-5600mm. Thus the system can also be used for bar stock, insulation materials or consumer goods. Users can integrate it seamlessly into their work processes by simply installing it in an existing feeding line. Thus the BEUMER bag-in-bag supplements the BEUMER fillpac in-line packer and the BEUMER paletpac high-performance palletiser.

Bagging, film packaging and palletising can be easily and seamlessly combined in a continuous production line. Expensive modification and system changes are unnecessary. The BEUMER bag-in-bag is designed for inline packers with a capacity of up to 800 bags per hour. The flexible BEUMER system can be configured for three different applications: a semi-automatic insular solution, a fully automatic depalletising, packaging and palletising line, or an integrated solution in which machines can be switched on individually. Thus the system can be adapted to specific customer requirements.



## North Africa: FLSmidth deal now effective

**F**LSmidth says that a contract for a cement plant valued at more than Euro100m in an unspecified location in North Africa is now effective. The change in the project's status follows the completion of various conditions, including the receipt of a down payment for the work.

The order is in part a result of the partnership between FLSmidth and Beijing Triumph International Engineering Company, a company under the China National Building Material Group Corporation (CNBM Group), which will be responsible for the construction of the cement plant. The plant will mainly supply cement to the North African market. Once completed, the cement plant will have a capacity of 12,000t/day. This includes engineering, equipment supply, construction supervision, commissioning and training.

## China: Anhui Conch Cement to buy drilling rig from Atlas Copco

**A**nhui Conch Cement plans to buy and import a hydraulic drilling rig for a limestone quarry supporting a cement plant at Tongchuan in Shaanxi. Atlas Copco is one of the lead suppliers of the equipment, according to Inside International Industrials. Delivery is scheduled by February 2018. The estimated cost is around US\$1.7m.

The overall mining project is expected to have a production capacity of 4500t/day with a total value of US\$61m. Construction is planned to begin in the first half of 2018. It was approved by Shaanxi Provincial Development and Reform Commission in mid-2017.

## US: GCP Applied Technologies launches new cement additives

**G**CP Applied Technologies has launched two new cement additives: Opteva HE quality improvers and Taverro VM grinding aids. Opteva HE is intended to enhance early strength and is targeted at 'challenging' cements. Taverro VM is a grinding aid additive intended to help stabilise vertical roller mills during production by reducing water injection requirements and cement pre-hydration. It also improves cement performance by delivering higher strengths and shorter setting times. The company intends to expand its range of additives for cement production under the Opteva and Taverro brands.



## Germany: HeidelbergCement revenue builds

HeidelbergCement has started to build its sales revenue following its acquisition of Italcementi with growth in Europe and North America. Its sales rose by 19% year-on-year to Euro13bn in the first nine months of 2017 from Euro10.9bn in the same period in 2016. On a like-for-like basis this rose by 1.1%. Its cement and clinker sales volumes rose by 29.2% to 94.4Mt from 73Mt or by 0.3% on a like-for-like basis.

"As expected, the positive trend reversal in May 2017 led to a significantly improved development of results in the third quarter", said chairman of the managing board, Bernd Scheifele. "North America, Australia, Morocco, India, as well as Northern and Eastern Europe have developed very strongly. The countries of Southern Europe are showing clear signs of recovery, and the emerging countries have passed their lowest point. We have succeeded in reducing the rise in energy costs through the flexible use of various fuels." He added that the synergies from the acquisition of Italcementi have already 'significantly' exceeded the target for 2017.

By region cement sales volumes rose in all regions on both a consolidated and pro-forma basis except for the group's Northern and Eastern Europe - Central Asia and its Asia-Pacific regions. In the US strong markets were noted in California and Washington, alongside price growth. In Indonesia the cement producer said that despite the market showing signs of recovery it was still facing price pressure. In Egypt continued reduced market demand was reported.

## Greece: Titan improves

Titan Cement's sales and operating profit have all benefited from growth in the US so far in 2017. The group's net sales grew by 1.8% year-on-year to Euro1.14bn in the first nine months of 2017 from Euro1.12bn in the same period of 2016. Its earnings before interest, taxation, depreciation and amortisation (EBITDA) rose by 4.6% to Euro215m from Euro205m.

In the US sales grew by 14% to Euro667m in the year to date, despite a poor third quarter due to disruption by hurricanes and other weather events. In the group's Greece and Western Europe region, sales fell by 3% to Euro190m and earnings also fell. However, sales rose in Southeastern Europe by 10.5% to Euro173m, although rising fuel costs dented its earnings.

Market conditions remained 'challenging' in Egypt with demand for building materials in 2017 estimated to be about 8% below the previous year's levels and prices still impacted by the low value of the Egyptian Pound. Overall, the group's Eastern Mediterranean region saw its sales fall by 39% to Euro114m and earnings fell by 66% to Euro11.1m. Further issues were reported in Turkey due to competition, but joint venture operations in Brazil saw faint improvements in the third quarter of the year.

## Switzerland: LafargeHolcim grows sales in first nine months

LafargeHolcim has grown its sales and earnings on a like-for-like basis so far in 2017. Its net sales rose by 4.3% on a like-for-like basis to Euro16.7bn in the first nine months of 2017 from Euro17.5bn in the same period of 2016. Its operating earnings before interest, taxation, depreciation and amortisation (EBITDA) adjusted rose by 9.2% to Euro3.69bn. Cement sales volumes fell to 156Mt from 177Mt, although this was reported as a rise of 1.8% on a like-for-like basis.

The cement producer attributed its gains to positive contributions from markets in Latin America, North America and Europe. However, market conditions were reported to be challenging in Asia Pacific and Middle East Africa where it said that actions are being taken to address weakness in key countries.

"While the company delivered solid quarterly results, they do not reflect our full potential. As the market leader, we will hold ourselves to a higher

standard than anyone else in our sector," said Jan Jenisch, group chief executive officer (CEO) of LafargeHolcim. "Today we have reset expectations for the group's outlook to a level that reflects the current business dynamics. While I am reviewing the business, I have an immediate focus on simplification, cost discipline and performance management."



## Italy: Cementir stabilises

Sales in Scandinavia and the US have stabilised Cementir's growth so far in 2017. Its sales volumes of cement and clinker increased by 1.7% year-on-year, on a like-for-like basis, to 9.6Mt in the first nine months of 2017. This was attributed to a 'favourable' performance in Denmark, Egypt, Malaysia and China and slight growth in Turkey, although Italy recorded a downturn in sales volumes.

The group's sales revenue remained flat at Euro964m for the period, on a like-for-like basis, despite the negative impact of foreign exchange rates. The group said that the positive trend of revenue in Norway, Denmark, Sweden, China and Italy offset a drop in Turkey and the fall in revenues expressed in Euros in Egypt, while revenue performance in Malaysia was almost stable. Cementir's earnings before interest, taxation, depreciation and amortisation (EBITDA) rose by 0.6% on a like-for-like basis to Euro152m.



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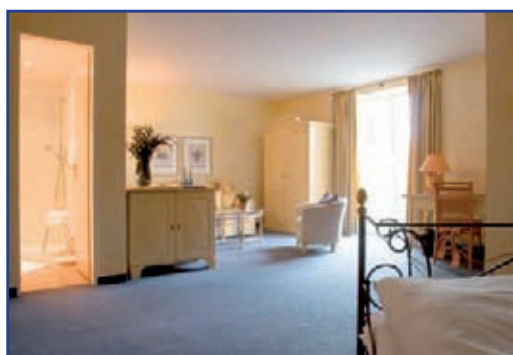
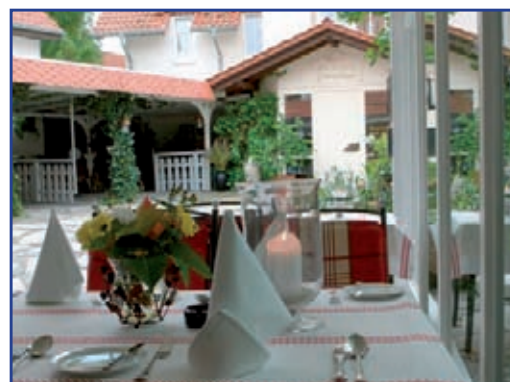
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## EU: ETS changes provisionally agreed

The European Parliament and Council have reached a provisional agreement to revise the European Union (EU) Emissions Trading System (EU ETS) for the period after 2020. This revision is intended to help the EU on track to achieving its commitment under the Paris Agreement to reduce greenhouse gas emissions by at least 40% by 2030. The deal between the parliament and council follows more than two years of negotiations, following the European Commission's proposal to revise the EU ETS in July 2015.

The main improvements agreed by parliament and council include changes to the system in order to hasten emissions reductions and strengthen the Market Stability Reserve to speed up the reduction of the current over-supply of allowances on the carbon market. Additional safeguards have been proposed to provide European industry with extra protection, if needed, against the risk of carbon leakage. Several support mechanisms have



also been added to help industry meet the innovation and investment challenges of the transition to a low-carbon economy.

Cembureau, the European Cement Association, said that it had hoped, "...for a stronger signal towards best performing plants that their investment efforts will be honoured through a full protection against carbon leakage and is still concerned about the impact of a cross-sectoral correction factor." However, it added that it was pleased that the EU had withstood attempts to differentiate between sectors in applying the rules of the ETS scheme.

Environmental campaign group Sandbag criticised the amendments for not going far enough to cope with a gap between allowance supply and emissions. "The logic of the Paris Agreement is that all countries need to step up ambition to cut emissions. With the ETS hobbled, the EU and Member States must now immediately look to how emissions can be cut rapidly before 2020 and in the period up to 2030. Accelerating coal plant closures and supporting the efforts of industry to decarbonise is essential," said Sandbag's managing director Rachel Solomon Williams.

Following the political agreement between the parliament, council and commission, also known as a trilogue, the text will have to be formally approved by the parliament and the council. Once endorsed by both co-legislators, the revised EU ETS Directive will be published in the Official Journal of the Union and enters into force 20 days after publication.

## Germany: Union network at HeidelbergCement

Union delegates representing workers at HeidelbergCement have created a trade union network. Forty delegates from Europe, Middle East and North Africa, North America, Asia-Pacific and South Asia met in early November 2017 in Bremen. The meeting was organized by IndustriALL Global Union with support of the Friedrich Ebert Foundation, also involving IndustriALL's sister organisation Building and Wood Workers' International.

"With the creation of the HeidelbergCement union network, we open the door to social dialogue if management is willing, and we hope union activists will contribute seriously to the promotion of workers' rights and interests in the company. To this end, the steering committee will be in close interaction with the national unions. Finally, we strongly believe that HeidelbergCement will only win through workers' active participation and engagement," said Matthias Hartwich, director for materials industry at IndustriALL.

The meeting discussed recent developments in the cement sector and sustainability issues. The experience of global and national unions interacting with management at another big cement company, LafargeHolcim, was also raised. At the end of the meeting, delegates unanimously adopted a Bremen declaration and elected a steering

committee for the network, which will coordinate the work in between its global meetings. No representative of the group's global management attended the event despite being sent invitations.

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## France: Vicat sales grow

Vicat's cement sales have grown by 4.3%, at constant scope and exchange rates, to Euro932m in the first nine months of 2017. Its cement sales volumes rose by 1.6% year-on-year to 16.9Mt from 16.6Mt. Overall, the construction materials company's sales increased by 2.9% to Euro1.92bn from Euro1.87bn.

"In the first nine months of the year our sales grew at a healthy pace. This was achieved through further growth in the US, despite tough weather conditions in the south east, and a gradual improvement in the French, Indian and Kazakh markets," said group chairman and chief executive officer (CEO) Guy Sidos.

## UK: RHI Magnesita starts trading on LSE

Refractories giant RHI Magnesita has started trading on the London Stock Exchange (LSE). It has been admitted to trading in the premium segment of the main market on the LSE. The start of trading on the exchange marks the completion of the merger process between RHI and Magnesita.

## Germany: New VDMA Chairman

Franz-Josef Paus has been elected as the chairman of the Mechanical Engineering Industry Association (VDMA) for the next three years. Paus, aged 55 years, is an executive at Hermann Paus Maschinenfabrik. He succeeds Johann Sailer, a managing partner of GEDA-Dechentreiter, who has decided to step down after a six-year tenure. The appointment of Paus was formerly announced at the association's General Assembly in Düsseldorf. Joachim Strobel, the sales director of Liebherr Emtec, and Hermann Weckenmann, a managing partner at Weckenmann Anlagentechnik, will act as his deputies in the role.

## Germany: TLT-Turbo expands workshop

Guests from throughout Europe converged on TLT-Turbo's expanded service workshop in Bad Hersfeld, Germany on 8 November 2017 to celebrate the impressive facility. See the January 2018 issue of *Global Cement Magazine* for a full review of the special occasion.



Above: A view of TLT-Turbo GmbH's recently-expanded service-workshop.



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## GLOBAL CEMENT NEWS: EUROPE

### Ireland: Steady improvement for CRH

CRH's like-for-like group sales for the third quarter of 2017 rose by 3%, boosted by continued underlying growth in the Americas, although some operations were hit by adverse weather. CRH, which is in the final stages of buying US-based Ash Grove Cement for Euro2.98bn, added that it continues to expect another year of progress in 2017, with earnings before interest, taxes, depreciation and amortisation (EBITDA) of more than Euro3.2bn. This is 2.2% higher than the Euro3.13bn EBITDA it saw during 2016.

Group sales for the nine months as a whole were



Euro20.7bn, an increase of 2% compared to the same period of 2016. EBITDA for the nine months was also 2% higher at Euro2.43bn.

### Germany: HeidelbergCement and EMBL explore solutions for CO<sub>2</sub> reduction

HeidelbergCement and the European Molecular Biology Laboratory (EMBL) have signed an agreement on a three-year collaboration to exchange scientific and technical knowledge. A new Memorandum of Understanding co-signed by EMBL and HeidelbergCement aims to encourage beneficial knowledge exchange in areas related to CO<sub>2</sub> emission reduction, avoidance and recovery, as well as driving innovation.

"We are delighted to be partnering with EMBL, one of the world's leading research institutions for molecular biology, to jointly explore innovative approaches to fight climate change," explained Dr Bernd Scheifele, Chairman of the Managing Board of HeidelbergCement AG. "This will further strengthen our competence and our commitment to reduce the environmental footprint of our business."

HeidelbergCement and EMBL will focus their collaborative activities on the coordination of conferences and workshops, bringing international experts to EMBL's Advanced Training Centre to learn about and debate these important research areas. Meetings will also be initiated that bring together experts from

both organisations to develop ideas, action plans and sustainable business practices. During the three-year period, HeidelbergCement and EMBL will also explore further areas for mutually beneficial collaborations.

"Climate change is an incredibly pressing issue" says EMBL Director, Prof. Matthias W Hentze. "The science underpinning it is complex and we need the best scientists worldwide to put their heads together to look for innovative solutions. Building on our strong network of internationally leading scientists, EMBL will help facilitate this collaboration and promote discussion between experts."

HeidelbergCement's activities include the production and distribution of cement and aggregates, the two essential raw materials for concrete. With respect to volumes, concrete is the second most produced substance by mankind after drinking water. This is why almost 6% of all global CO<sub>2</sub> emissions are due to from cement production. In order to reduce this environmental footprint, HeidelbergCement has pledged to lower specific CO<sub>2</sub> emissions by 30% by 2030 in comparison to 1990 levels.

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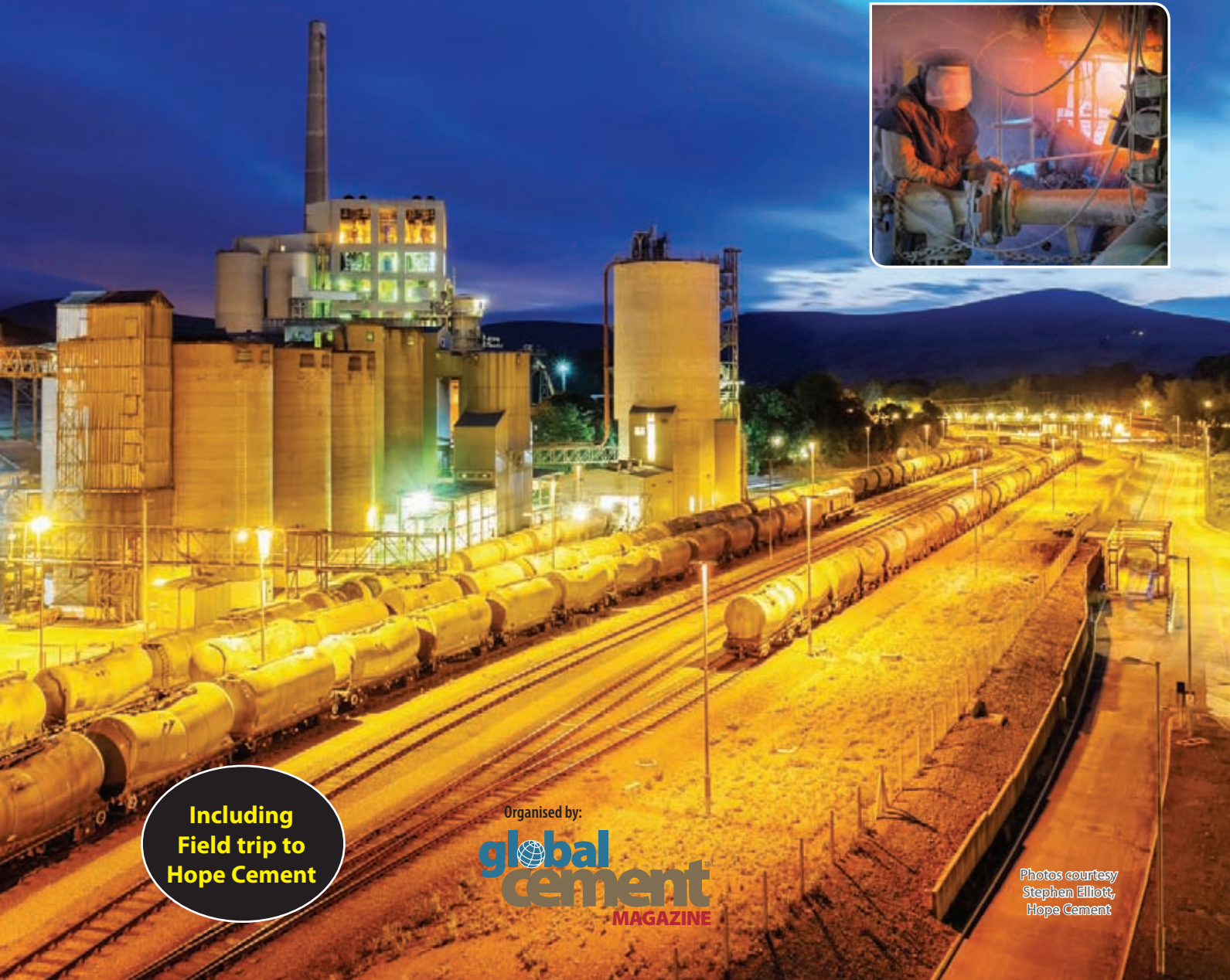
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## VDZ Cement Conference 2017: In pictures

The *VDZ Annual Cement Conference 2017* took place on 19-20 September 2017 in Düsseldorf, Germany. It attracted around 360 delegates who heard from 19 varied presenters. Here, *Global Cement* presents a photographic review of the event. The next edition of the event, the *8th VDZ International Congress*, will take place on 26-28 September 2018 in Düsseldorf. This international event will attract a substantial additional audience from around the global cement industry.

**1:** Christian Knell, President of the VDZ, welcomed delegates to the event.



**2:** Dr Martin Schneider, Chief Executive of the VDZ, presented on the successes and milestones of the VDZ over its 140 year history.



**3:** Michael Janzer of CemProTec in discussion.



**4:** Dipl.-Ing. Matthias Puchta of the Fraunhofer Institute spoke about the use of concrete balls for energy storage.



**5:** Prof. Dr. Gunter Dueck presented on the topic the disruption caused by and the opportunities of the digital revolution in the workplace.



**6:** Dipl.-Ing. Paul Clemens of Zementwerk Lübeck presented a new concept for separate grinding of slag-containing cements.



**7:** Eduardo Gallesty, ABB Industrie, presented on the topic of Industry 4.0.



**8:** HeidelbergCement's Dipl.-Ing. Michael Becker spoke on the use of tail-end SCR systems.



**9:** The VDZ's Ute Zunzer spoke about the first measurement results with the sorbent trap method in comparison to the standard reference methods.





10



11

**10:** Schretter & Cie's Dr.-Ing. Thomas Ostheimer presented on his company's use of the CemProTec Smart-Glider at its plant in Vils, Tyrol, Austria.

**11:** A drinks reception before the Annual Safety Awards Dinner.



12



13

**12:** The winners of the annual safety prizes pose for the camera.

**13:** From left to right: Tatjana Sosnovich, Eugen Geibel, Dr Nijat Orujov and Dr Guido Furth of the VDZ enjoying the event.



14



15

**14:** Wolfgang Schwarzer of Spenner Zement (right) in discussion with other delegates.

**15:** Franz-Josef Hemmer of Welconnect (right) in discussion with VDZ staff.



16



17

**17:** An attentive audience applauds one of the 19 presenters.



David Perilli, Global Cement Magazine

## EuroSlag 2017 Review: Finding a place for slag

The 9th European Slag Conference, organised by Euroslag with the local support of AFOCO, the French Industrial Co-products Operators Association, took place on 11-13 October 2017 in Metz, France. *Global Cement's* David Perilli was in attendance...

**1:** Hervé Martin, head of the European Commission Coal and Steel Research Unit opened proceedings with his presentation on the opportunities for the slag industry in the circular economy.

Putting two speakers from the European Commission front and centre at the start of this year's European Slag Association Conference (EuroSlag) in Metz, France, was always going to cause a ruck. Once Coal and Steel Research Unit head **Hervé Martin** and steel sector policy officer **Gabriele Morgante** said their pieces and the Round Table Discussion opened up, the verbal punches started flying. Okay, this may be a slight exaggeration, but after a bunch of policy-heavy presentations, suddenly the stakes became crystal clear. Was the agricultural use of ferrous slag going to be allowed to continue? What would be the classification of the slag? And so on... One Russian delegate commented afterwards, "I thought we had environmental problems in Russia."

**Jérémy Domas**, Centre Technique et de Promotion des Laitiers Sidérurgiques (CTPL), explained in a later presentation that the heart of the current debate goes back to the European Waste Framework Directive (2008/98/EC). This legislation created an ambiguity over the status of slag between classifying it as a waste or as a by-product, that the European industry has been battling over ever since. A multi-coloured map in **Aurelio Braconi** of the European Steel Association's (Eurofer) presentation depicted the disarray this has caused with the varied legal statuses of slag across Europe. To add to this, Braconi's home country of Italy, for example, is split into designating slag as both a product *and* a waste.

**2:** A full presentation room inside the Arsenal Concert Hall in Metz, France.



His response was to say that the 'human factor' was important back home for utilising slag. The European Union (EU) is now working on its Circular Economy Package, which includes revised legislative proposals on waste, and it has been consulting on various issues throughout the year. It is this process that has been making slag producers twitchy.

Other delegates on the first session's panel provided a bit more context, with **Thomas Reiche** of the German Technical Association for Ferrous Slag (FEhS) saying that the waste legislation didn't need to be changed but that public procurement laws did. **Eric Seitz** of the French Association of the Users of industrial By-products (AFOCO) added that slag products had been sold for decades without any problems. However, he definitely wanted 'strong' support from the EU on the issue.

Moving on, **Craig Heidrich** of the Australasian (Iron & Steel) Slag Association (ASA) provided some interesting figures in his presentation on worldwide slag production that differ from the data often stated by trading companies. Heidrich reckoned that 567Mt of slag was produced in 2015 with a breakdown of 347Mt blast furnace (BF) slag and 220Mt steel slag.

**Andreas Ehrenberg** of the FEhS presented research on converting electric arc furnace (EAF) slag into a hydraulic material that could be used in cement or concrete production. Given that, using Heidrich's figures for example, about a third of ferrous slag production is steel slag created in an EAF, the potential implications of this line of inquiry



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**3:** Gabriele Morgante from the European Commission's Directorate General for Growth, Resource Efficiency and Raw Materials presented the European Commission's view.



**4:** Aurelio Braconi from ECOFER spoke about how to boost EU industrial symbiosis and recycling from the perspective of the steel industry.



**5:** Chris Poling from US-based SCB International Materials introduced his company's micro slag grinding mill.



**6:** Thomas Reiche from the FEhS speaking during the Round Table Discussion.



the research further will require much more work on the semi-technical scale.

Another paper with particular relevance to the cement industry was **Chris Poling** of SCB International unveiling his company's ground blast furnace slag (GBFS) micro-grinding mill, the Nutek Mill 2. The new mill is intended to allow slag grinding to take place in a much wider range of locations, along similar lines to the modular clinker grinding mills like Cemengal's Plug & Grind system or Gebr.

are important. Unfortunately, the main disadvantages of the original EAF slag analysed in Ehrenberg's work compared to BF slag are the lower CaO and SiO<sub>2</sub> contents and the higher MgO and Fe oxide contents. Laboratory-scale tests confirmed in principle the feasibility of forming clinker or ground blast furnace slag-like materials based on EAF slag. However, the reduction and treatment steps in the process require a lot of effort and the economical value of the recovered metal is low. Taking


**7:** Delegates were treated to a four course Michelin Star Gala Dinner with entertainment.



**8:** Overview of the exhibition area.



Pfeiffer's Ready2Grind concept. The pilot project is being installed now in New York State, US. The mill has a GBFS capacity of 10-12t/hr with a target of 40-45kWh/t when fully optimised. Further units at the same location are planned for early 2018 with approval sought from the New York State Department of Transportation.

The 10th *European Slag Conference* is expected to take place in 2019. With more clarity expected from the EU on its Circular Economy Package, there will be much to discuss. 



## Colombia: Argos falls due to domestic slump

Cementos Argos' sales revenue and earnings have fallen in the first nine months of 2017 due to poor performance in Colombia. Its sales revenue fell by 1.3% year-on-year to US\$2.14bn from US\$2.17bn in the same period in 2016. Its earnings before interest, taxation, depreciation and amortisation (EBITDA) fell by 16.8% to US\$352m from US\$424m. However, its cement sales volumes rose by 15.4% to 12.2Mt from 10.5Mt.

"Thanks to the sound implementation of the BEST Program, we have made significant improvements in a particularly challenging year for our industry. By the end of this year, we are optimistic about the performance of all the markets in which we operate," said Juan Esteban Calle, chief executive officer (CEO) of Cementos Argos.

By region, the cement producer reported growth in the US but problems in Colombia. It highlighted that cement and clinker imports to Colombia have fallen in 2017 due to rising tariffs. It also expects the local market to recover in 2018. In the Caribbean and Central America, the group's performance suffered from extreme weather events, although it managed to grow its revenue. It also reported that its cement plant in Puerto Rico is still not operational three months after Hurricane Irma.

## Brazil: Votorantim stable as even Brazil improves

Votorantim Cimentos' sales revenue has remained stable at US\$968m in the third quarter of 2017, boosted by its performance in North America. At home in Brazil, the cement producer benefited from improved market conditions, including higher prices and higher revenues from mortars and agricultural lime. Despite this, its local revenue fell by 4.9% year-on-year in line with the national market. The cement producer's adjusted earnings before interest, taxation, depreciation and amortisation (EBITDA) fell by 27% to US\$157m but the company blamed this on a non-recurring tax adjustment.

## US: New PCA President and CEO

The Portland Cement Association (PCA) board of directors has appointed Michael Ireland as president and chief executive officer (CEO). He replaces former President and CEO James Toscas.

In addition, the PCA board of directors elected the following new members: Greg Hale from Capitol Aggregates; Steve Regis, Bruce Shafer and Mark Wagy from CalPortland Company; Enrique Rozas from Drake Cement and Mike Ireland of the PCA.

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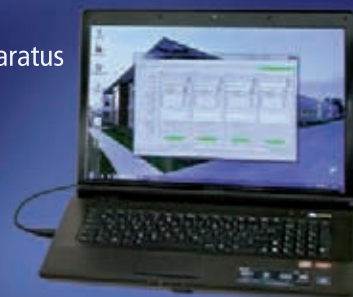
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## US: Long-term Lucerne Valley plant manager Bud Biggs dies

**B**ud Biggs, the long-term plant manager of the Mitsubishi Cement plant in Lucerne Valley, California, died at the age of 77 on 18 November 2017. It is thought that he suffered a heart attack. Biggs, who only retired in February 2017, had been manager of the plant since 1986.

Bud Biggs began his career at Kaiser Cement in Cupertino, California in 1962, first working in quality control and in concrete research. He obtained a bachelor's degree in chemistry in 1980 while working for the company. After a period working in Texas, he returned to California in 1986 to work at Kaiser Cement's Lucerne Valley plant. Initially working as production manager, he was promoted to plant manager shortly afterwards, retaining his role when Mitsubishi Cement acquired Kaiser Cement.

Over the years Biggs made great contributions to the local community. In 2005 he and Mitsubishi Cement's Senior Vice President Mike Jasberg formed the Mitsubishi Cement Corporation Educational Foundation (MCCEF), which provides additional funding for local schools and scholarships for students. Biggs was also on the boards of several other local educational and professional institutes.



Above: Bug Biggs, who has died at the age of 77.

## US: Loma Negra sets IPO price

**L**oma Negra has set the price of its initial public offering on the New York Stock Exchange. It plans to raise about US\$954m from the sale.

## Peru: Modular plant for Invercem

**I**nvercem plans to build a cement grinding plant in Ica for US\$20m. The modular plant will have a production capacity of 0.25Mt/yr, according to the Gestión newspaper. Construction is scheduled to start from December 2017, with completion planned for April 2018.

Previously, Invercem has imported cement from HeidelbergCement via the port of Salaverry. It then bagged and sold it locally under the Qhuna brand. As well as building its own plant the cement importer is also considering expansion plans in Ayacucho, Cusco and Iquitos.

## Peru: Cempor fights legal action from Unacem over plant project

**U**nacem has filed a lawsuit alleging environmental violations against Cempor. Cempor, a joint venture between Chile's Cementos Bío Bío and Brazil's Votorantim, plans to build a cement plant in Lima, according to the La Tercera newspaper. The legal move is the latest action in a long running battle between the cement producers over the project. Cempor has responded by alleging to National Institute for the Defence of Free Competition and the Protection of Intellectual Property (INDECOPI) that Unacem's conduct is contrary to the functioning of a free market.

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

## Costa Rica: Chinese ambassador denies links with Sinocem Costa Rica

**T**ang Heng, the Chinese Ambassador to Costa Rica, has confirmed that Sinocem China has ended all commercial relations with Sinocem Costa Rica. The statement was made due to an investigation into alleged irregularities and lobbying involving the owner of Sinocem Costa Rica, Juan Carlos Bolanos, and certain officials of state-owned bank Banco de Costa Rica, according to La Nación newspaper. According to Heng, Hangzhou Sinocem Building Materials said in July 2017 that Sinocem China had stopped supplying cement to Sinocem Costa Rica as the latter allegedly purchased cement from other Chinese cement suppliers and continued to use the Sinocem brand on packaging without its permission.

## Bolivia: Calls for a new plant

**T**he mining industry chamber in Tarija wants governor Adrian Oliva to build a new cement plant in Mendez province. The proposal follows confirmation by the National Geology and Mining Technician Service (Sernameomin) of 'large' limestone deposits, according to the El País newspaper. Sociedad Boliviana de Cemento (Sobocem) currently operates a 0.2Mt/yr plant at El Puente in the same region.

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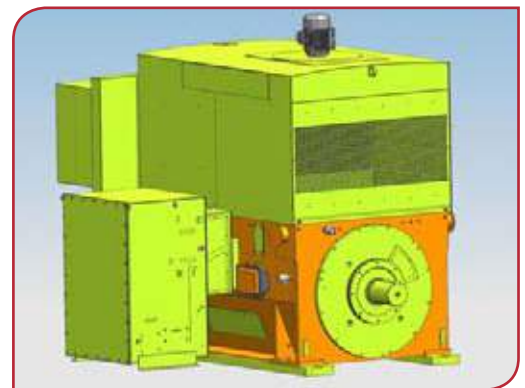
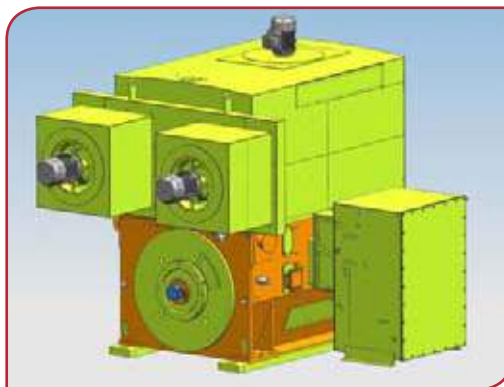
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## Biggest ever induction motor in US enhances efficiency of Waco cement plant

Lehigh Texas, part of HeidelbergCement, has recently completed a modernisation project with the help of Siemens, thyssenkrupp Industrial Solutions and the biggest ever induction motor to be used in the United States.


Lehigh Texas' production plants stretch across the entire south and southeast of Texas in the USA. A socially and ecologically committed global exporter of cement products, Lehigh Texas recently undertook extensive modernisation measures in its Waco facility, which would not only make the plant more profitable and further improve its availability, but also drive down its energy consumption and increase plant safety. LT commissioned Siemens and thyssenkrupp Industrial Solutions (TKIS), two well-known companies in the field of industrial drive technology and power distribution, to take charge of the complex project.

**Images:** Lehigh Texas commissioned Siemens and thyssenkrupp to modernise the drive technology in its Waco cement factory.



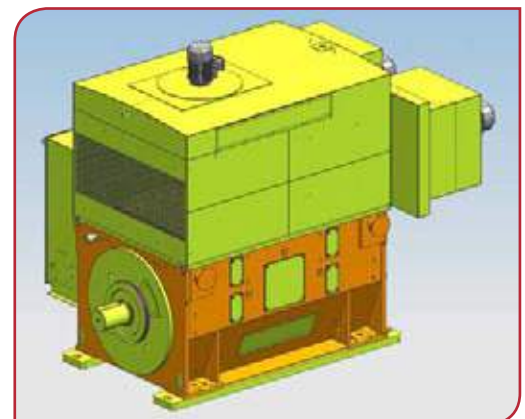
ble speed control allows the plant operator to directly control the process.

### Low-maintenance giant

The new Simotic induction motor requires exceptionally little maintenance as it has fewer spare and wearing parts than the previous drive. This also helps increase the plant's availability. The project, which entailed installation of the biggest UL-certified induction motor ever to be produced in the USA, was implemented in 2017 with a lead time of just 32 weeks. It was completed exactly on time. 

### Direct process control

Siemens equipment used to implement the modernisation project included an FR3 immersion isolating transformer, 24 pulse Sinamics GM150 frequency converters with CSA certification, an air-cooled IP55 totally enclosed air-to-air cooler (TEAAC), variable-speed 2000 HP Simotic induction motors and a power distribution centre (PDC). The PDC was tested prior to installation in order to reduce the commissioning time needed. The new motor, which replaced the previous synchronous model, does not require a direct current (DC) circuit in the motor, enables rapid diagnostics and troubleshooting, and also offers the capability of remote support. Its varia-





### India: ICRA more up-beat for Q4 FY2018

ICRA is expecting cement demand to pick up in the fourth quarter of the 2017 – 2018 financial year (FY2018) following weak real estate activity, a sand shortage and issues surrounding the implementation of the Goods and Service tax (GST) in the first half of the year. In its October 2017 update, the credit ratings agency said that demand was expected to benefit from the housing sector and road and irrigation projects in the infrastructure sector. It added that the profitability of the industry depends on the industry's ability to control prices given that higher input costs for fuel and freight are expected.

The credit ratings agency said that cement demand remained subdued across the country due to various local issues. In the north, especially in the states of Uttar Pradesh and Punjab, the offtake had been impacted by a sand shortage and lack of labour. In the west the implementation of the Real Estate Regulatory Authority (RERA) Bill resulted in construction activity slowing down. In the south, Tamil Nadu and Kerala were hit as demand was affected by the sand shortage, drought impacting rural offtake and weak housing activity. A recent ban on sand mining in Bihar is also likely to reduce sales volume growth in the eastern region in coming months.

### Thailand: SCG on the up in first nine months of 2017

Siam Cement Company's (SCG) sales revenue from its cement business has increased so far in 2017 due to contributions from expanded operations in the Association of Southeast Asian Nations (ASEAN) region. Its sales rose by 2% year-on-year to US\$4bn for the first nine months of 2017. However, its earnings before interest, taxation, depreciation and amortisation fell by 6% to US\$526m, mainly due to weaker demand in Thailand.

### India: Work starts on JSW plant

Shri Naveen Patnaik, the Chief Minister of Odisha, has laid the foundation stone for a 1.2Mt/yr cement grinding plant that JSW Cement is building at Kalinganagar in Jajpur. The plant is scheduled to start operations in 2018, according to the Orissa Diary. Once the unit is commissioned the cement producer has plans to double its production capacity to 2.4Mt/yr.

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## Australia: Geelong gets go-ahead

Environment Protection Authority Victoria (EPA) has approved an application from Boral Cement to build a new 1.3Mt/yr cement grinding plant at Geelong in Melbourne, Victoria. The works will include an enclosed ball mill and covered store, covered belt conveyors, outdoor product stockpiles and several finished product storage and distribution silos at the site. Clinker will be unloaded from ships and delivered to the site via covered belt conveyors from Lascelles Wharf. The facility will operate 24 hours per day.

The EPA added that Boral Cement undertook community consultation prior to the submission of the application and during the public submission period.



## Australia: Brickworks proposal threatens Wagners' IPO

An initial public offering by Wagners has been threatened by plans by a rival company to build a cement grinding plant and terminal in Brisbane, Queensland. Wagners operates its own 0.8Mt/yr grinding plant in the city and commentators mentioned by The Australian newspaper have speculated that this increased competition locally could damage its aspirations. However, Wagners believes that the new plant is unlikely to be built. The 0.2Mt/yr project from

brick and tile maker Brickworks, in a consortium with Newman Quarrying and the Neilsen Group, remains in the planning stage.

## Australia: Adelaide Brighton investigates payments

Adelaide Brighton is investigating a series of transactions to a small number of customers who may have underpaid for the products supplied to them. The cement producer says it is investigating the situation 'fully' with the aid of the forensic accountants KPMG. It added that it is possible that an employee of the company is involved.

The company believes that, based on the evidence so far, it appears that there may have been deliberately hidden underpayments by customers over a sustained period. This may have a negative impact on the company's 2017 earning before interest and taxation (EBIT), currently estimated to be up to US\$11m, less the impact of any recoveries that may be made. Adelaide Brighton has reported the situation to its auditors and will co-operate with relevant authorities as the investigation proceeds.

## Vietnam: 26Mt surplus in 2017

Vietnam sold 64.6Mt of cement in the first 10 months of 2017, a rise of 4% year-on-year compared to the same period of 2016, according to the Ministry of Construction. Of the sum, 49.3Mt was sold domestically, a 2% year-on-year rise, while 15.3Mt was exported, a rise of 2%.

In October 2017, local firms sold 6.2Mt of cement, including 4.7Mt of domestic sales, and 1.5Mt of exports. As of October 2017, Vietnam had 3.3Mt of cement and clinker inventory, mostly clinker.

At present, Vietnam's cement output has reached 86Mt/yr, while domestic demand is estimated at only 60Mt. The country is thus predicted to face a surplus of 26Mt of cement overall in 2017, according to the Vietnam Cement Association (VNCA).



Above: Workers manually load a barge at Hoang Thach Cement.

## India: Shree revenue falls

Shree Cement's sales revenue fell by 5.8% year-on-year to US\$807m in the six months to the end of September 2017 from US\$761m in the same period in 2016. Its profit fell by 18.4% to US\$100m from US\$123m. However, its sales and profit rose for its cement business and fell in its power business.

## Philippines: Eagle Cement's profit rises by 8%

Eagle Cement's net profit rose by 8% year-on-year to US\$64.4m in the first nine months of 2017 from US\$59.7m in the same period in 2016. It attributed the growth to higher sales volumes, despite tight competition, according to the Manila Bulletin newspaper. Its net sales revenue grew by 12% to US\$219m from US\$196m. This was due to over 20% growth in the sales volume of bagged and bulk cement, even though the price of cement has fallen, in part because of imports. The cement producer is set to commission a third production line at its Bulacan plant in 2018.

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## India: UltraTech Cement profit drops on fuel price hike

UltraTech Cement has blamed a drop in its profit on rising fuel prices. Its net profit fell by 31% year-on-year to US\$65m in the second quarter of its financial year that ended on 30 September 2017, from US\$94m in the same period of 2016.

Overall the cement producer's sales revenue has risen by 6.5% year-on-year to US\$2.28bn in the first six months of its 2017 – 2018 financial year from US\$2.15bn in the same period in the 2016 – 2017 period. Its net profit fell by 5% to US\$203m from US\$214m. Its sales volumes of cement rose by 8% to 26.3Mt from 24.4Mt. It completed its acquisition of 21.2Mt/yr cement production capacity from Jaiprakash Associates in June 2017. However, no like-for-like financial figures have been released.



## Uzbekistan: New 3Mt/yr plant for Akhangarancement plant by 2020

Beijing Triumph International Engineering, a subsidiary of China National Building Materials (CNBM), has signed a US\$160m deal with Eurocement's subsidiary Akhangarancement to build a new 3Mt/yr cement plant. The contract was signed during Russian Prime Minister Dmitry Medvedev's official visit to the Central Asian country, according to InterFax. The project will be completed by 2020. Eurocement chairman Filaret Galchev and Ustroyaterialy chief executive officer (CEO) Botir Zaripov signed the agreement on project implementation during Medvedev's visit.

Akhangarancement operates a 2.2Mt/yr cement plant. It holds a 30% share of the Uzbek market. The plant also exports to Kazakhstan, Kyrgyzstan and Turkmenistan. Eurocement purchased a 75.5% stake of Akhangarancement in August 2006 and bought the remaining share in 2013. It originally signed a US\$128m contract with China CAMC Engineering, a division of Sinomach, in 2014 for construction of a plant that was supposed to open in 2016. However, construction was subsequently cancelled.

Akhangarancement produced 1.44Mt of cement and 1.04Mt of clinker in the first nine months of 2017. This is 1.8% (25,449t) and 2.9% (29,147t) more than in the same period of 2016. The company also increased cement shipments to final customers by 2.6% to 11.46Mt.

## Kazakhstan: Rudny delayed to 2018

The opening of the Rudny Cement plant has been delayed to 2018. The regional government said that the US\$44m project is in the final stage of completion, according to Interfax. The 0.5Mt/yr plant has been postponed several times since 2010 due to a lack of finance. The most recent plan was to start production by the end of 2017.

## South Korea: CNBM / Sinoma merger approved

The South Korean Fair Trade Commission has approved the pending merger of China National Building Material (CNBM) and China National Materials (Sinoma) in South Korea. CNBM and Sinoma formerly entered into a merger agreement in September 2017.

## Georgia: HeidelbergCement sells 50% of its Georgian interests

HeidelbergCement has sold 50% of the voting rights in its Georgian business to Cement Invest, an investment company jointly managed and owned by the Georgian Co-Investment Fund (GCF) and Hunnewell Partners. HeidelbergCement and Cement Invest will jointly control the resulting joint venture. The transaction will contribute in total about Euro115m to cutting HeidelbergCement's net debt.

"The joint venture's competitiveness will be improved with the modernisation of the Kaspi cement plant, where the construction of a modern dry kiln line already started in 2016 and is expected to be finalised by the end of 2018. The disposal is part of our portfolio review and optimisation with the goal to generate additional cash flow in order to support our disciplined growth and increase shareholder returns," said Bernd Scheifele, chairman of the managing board of HeidelbergCement.

HeidelbergCement started operating in Georgia in 2006. The new joint venture operates three integrated cement plants, a cement grinding facility and a cement terminal on the Black Sea coast. The cement production capacity exceeds 2Mt/yr. A network of 13 ready-mixed concrete plants and two aggregate quarries supports the cement business.

## Malaysia: YTL founder Lay dies

Yeoh Tiong Lay, the founder of YTL Group, has died at the age of 88. Lay started with a construction company in Kuala Selangor in 1955 and built the company into a conglomerate including cement production, power generation, water and sewerage services, communications, construction contracting, property development and investment, hotel development, management and more. He was appointed to the board of directors of YTL Corp in 1984 and was appointed as the executive chairman in 1985.



## Saudi Arabia: Saudi Cement profit down more than 50%

Saudi Cement Company saw its profit drop by 56.9% year-on-year in the third quarter of 2017. Its net profit fell to US\$23.2m from US\$53.7m in the third quarter of 2017. The profit was 7.5% lower than the second quarter of 2017. Saudi Cement Company attributed the decrease to falling sales, the decline of the firm's stake in net financial results of associate companies and a fall in other revenues.

During the first nine months of 2017 the company's net profit was 51.5% down year-on-year, falling to US\$92.3m compared to US\$190.4m in the first nine months of 2016.

## Syria: LafargeHolcim and GBL raided in Europe

French police have searched the Paris offices of LafargeHolcim as part of an on-going investigation into the company's conduct in Syria. At the same time the offices of Belgium's Groupe Bruxelles Lambert (GBL) were also searched, according to the Agence France Presse (AFP). Both companies said they were cooperating with the investigations.

A source quoted by AFP said that the investigators are trying to find out if GBL had been aware of Lafarge Syria's activities in Syria. GBL is a shareholder of LafargeHolcim that held a 9.4% stake at the end of 2016. The investigation as a whole is attempting to determine whether LafargeHolcim's predecessor company Lafarge Syria paid terrorist groups in Syria and how much managers knew about the situation.

## Cameroon: Medcem to take Douala plant to 1Mt/yr

Medcem Cameroon plans to invest US\$10m to upgrade its 0.4Mt/yr cement grinding plant in Douala. Following the upgrade the unit will have a production capacity of 1Mt/yr. The investment has been planned to meet a demand increase, mostly driven by national infrastructure and construction projects. The project is planned for completion in 2018. Following the upgrade the cement producer will be the fourth largest in the country.

## Egypt/Middle East: AUCBM meeting in Sharm el Sheikh

The 22nd Arab International Cement Conference and Exhibition (AICCE) took place at the International Congress Center, Maritim Jolie Ville, in Sharm el Sheikh, Egypt, on 14-16 November, organised by the Arab Union for Cement and Building Materials (AUCBM). Over 100 exhibitors took part, including *Global Cement Magazine*, along with over 500 registered delegates. The next AICCE will take place in Amman, Jordan, in mid-November 2018.



## Ethiopia: Security issues in Oromia

Cement producers have faced disruption due to security issues in Oromia state. Habesha Cement suspended production at its Holeyta plant on 24 October 2017 due to youth protestors who occupied the site, according to the Reporter newspaper. The protestors took over the unit and demanded to be given jobs. The cement producer says that it has been active in community development projects and has a recruitment policy that gives priority to local communities.

In two separate incidents, five trucks belonging to Dangote Cement were set on fire over the course of a week in late October 2017. In one of the incidents, at Ambo, 10 people also died during clashes between protestors and the government.

## Nigeria: Lafarge Africa simplifies subsidiaries

The shareholders of Lafarge Africa have approved the merger with United Cement Company of Nigeria (Unicem) and Atlas Cement. Lafarge Africa chairman Bolaji Balogun said that the merger would streamline its operations and reduce its costs, according to the Nigerian Guardian newspaper. Lafarge Africa is the sole shareholder of Unicem and Atlas Cement.

Unicem operates the 5Mt/yr Mfamosing cement plant at Calabar in Cross River State. Atlas Cement runs a 0.5Mt/yr terminal in Rivers State at the Federal Ocean Terminal in Onne. It originally supplied Ordinary Portland Cement but is now changing its market to the oil and gas sector.

## Tunisia: Strike averted

A planned strike by workers at Carthage Cement was averted in November 2017. The decision to call off the industrial action followed a meeting between Finance Minister Ridha Chalghoum and the Tunisian General Labour Union Secretary General, Nouredine Taboubi.



## South Africa: CRH makes formal offer for PPC

Ireland's CRH has submitted a formal expression of interest to PPC, towards making a cash offer for a controlling stake in the South African cement producer. The board of PPC gave CRH until the week commencing 20 November 2017 to conduct due diligence and make a firm offer. PPC said that it is still considering an offer from Fairfax Financial Holdings with the aid of Investec. It is also in discussion with LafargeHolcim about a potential deal.

In the background, the Public Investment Corporation (PIC) has been steadily increasing its shareholding in PPC. It now owns a 25.1% stake. In March 2017 the PIC increased its shareholding in PPC to 15.1% and subsequently increased it further to 21.2% in October 2017.

## Cameroon: Dangote claims 45% share

The local subsidiary of Dangote Cement in Cameroon (DCC) claims to control 45% of the cement market just two years after opening a grinding plant in Douala. The cement producer aims to produce 1.3Mt of cement in 2017 from its 1.5Mt/yr plant, according to the Journal du Cameroun newspaper. Other producers in the local market include Cimencam, a subsidiary of LafargeHolcim that has a 45% share, and Medcem and CIMAF, which share the remaining market share.

## Nigeria: Ava Cement seeking investors

Godwin Obaseki, the Edo State Governor, says that the state is negotiating with the Assets Management Corporation of Nigeria (AMCON) to find a new investor for the Ava Cement plant. Obaseki made the statement while visiting the Igarra, the headquarters of Akoko Edo Local Government Area, according to the Daily Trust newspaper. AMCON took possession of the plant due to its mounting debts.

## Ghana: CMAG: Nigeria is dumping cement

George Dawson-Ahmoah, the chairman of the Cement Manufacturers Association of Ghana (CMAG), says that Nigeria is dumping cement in his country. He cited instances of imports of bagged cement from Nigeria, under the guise of the ECOWAS Trade Liberalisation Scheme (ETLS), as 'disturbing pricing' in the market, in an interview with the Business and Financial Times newspaper. Although Dawson-Ahmoah defended the ECOWAS scheme, he raised issues such as evidence of dumping and export subsidies as being a threat to local cement producers.

Speaking at an annual industry association meeting he alleged that cement imports from Nigeria are being sold in the country for less than its value in the originating country in violation of World Trade Organisation rules. He also criticised the local Export Expansion Grant subsidy.

## Ghana: New plant 90% backed by Iran

Ghana and Iran are set to build a 0.6Mt/yr cement plant at the Dawa Industrial Enclave near Tema in Ghana. Vice President Mahamadu Bawumia commissioned construction work at the project, which is scheduled for completion in late 2019. The project is a joint venture between the two countries, with Iran holding a 90% stake.

## Egypt: Helwan and Suez to merge

The board of directors of Suez Cement has agreed to merge with Helwan Cement. It also agreed to sell a 5% stake in Tura Cement. Both Suez Cement and Helwan Cement are owned by HeidelbergCement. Suez Cement operates two plants at Suez and Kattameya. Helwan Cement runs a single plant at Helwan.

## DRC: Producers back import ban

Cement producers have expressed their support for a ban on cement imports coming into the Democratic Republic of the Congo (DRC). The comments were made during an evaluation meeting on the ban held by the Minister of Foreign Trade, Jean Lucien Bussa, according to the Congolese News Agency. The minister noted that, since the ban was implemented on 25 August 2017, cement prices had not risen. Before the ban started, imports from Lufu, Angola, were blamed for flooding the market.

## Tanzania: Tanga takings tumble

Tanga Cement's earnings have fallen significantly due to low cement prices. Its operating earnings before interest, taxation, depreciation and amortisation (EBITDA) fell by 72% year-on-year to US\$2.26m in the first half of 2017. However, its sales revenue grew by 2% to US\$35m from US\$34.2m. The cement producer cut its prices in response to competition, raising its sales volumes and increasing its market share.



## Angola: Fuel shortage alleviated

Manuel Tavares de Almeida, the Minister of Construction and Public Works, says that cement plants will be able to buy heavy fuel oil (HFO) from the Luanda Refinery. The announcement follows fuel shortages in the country that have led to the Fabrica de Cimento do Kwanza Sul and Luanda Cemento plants being shut, according to the Angola Press Agency. The minister said he had received assurances from the refinery that HFO would be supplied to the cement industry.



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*.

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**Egypt:** Ordinary Portland Cement prices as of 22 November 2017: Arabian Cement (Al Mosalah) = US\$48.58/t; Arabian Cement (Al Nasr) = US\$46.89/t; Cemex (Al Muhandis) = US\$49.15/t; Wadi El Nile Cement = US\$46.50/t; Lafarge (Al Makhous) = US\$46.33/t; Arish Cement = US\$46.60/t; Sinai Cement = US\$46.60/t; National Cement = US\$48.86/t; Suez Cement = US\$47.90/t; Tourah Portland Cement = US\$47.90/t; Helwan Cement = US\$47.90/t; Misr Beni Suef Cement = US\$47.18/t; El Sewedy Cement = US\$48.59/t; South Valley Cement = US\$46.60/t; Misr Cement Qena = US\$46.33/t.

White cement prices as of 22 November 2017: Sinai White Cement (Alabid Elada) = US\$100.55/t; Sinai White Cement (Super Sinai) = US\$97.73/t; El Menya Cement - Super Royal = US\$97.16/t; Menya Helwan Cement = US\$97.16/t.

Blended cement prices as of 22 November 2017: Sinai Cement - Alnakheel = US\$42.28/t; Helwan Cement - Alwaha = US\$42.37/t.

Sulphate-resistant cement prices as of 22 November 2017: Cemex Albukawem = US\$49.15/t; Suez Cement (Alsuez Sea Water) = US\$47.47/t; Lafarge (Kaher Albehar) = US\$48.58/t; Suez Cement (Al Suez Sea Water) = US\$48.60/t; El Sewedy Cement = US\$48.58/t.

**Malaysia:** The Penang branch of the Domestic Trade, Cooperatives and Consumerism Ministry seized 156t of fake masonry cement, valued at RM78,000 on 16 November 2017, following a complaint by the French legitimate producer of the product that was being impersonated.

Central Seberang Perai branch deputy chief, Mohd Azizan Mohd Rashid said, "The market price for original masonry cement is US\$5.84/bag (50kg), while the fake ones are sold at US\$4.87/bag. He also urged construction companies or members of the public who had bought the fake cement to come forward to

assist the investigation and not to use it due to its poor quality.

**Sudan:** The ex-works price of a bagged metric ton of CEM I cement is US\$86. This is nearly 24% lower than in the second quarter of 2017, mainly due to devaluation of the Sudanese Pound against the US Dollar.

**India:** Cement prices continued to fall across India in November 2017, indicative of lower-than-expected demand for building materials, according to Bloomberg. November is usually a period of stronger activity for the country. In the north of India, the average price was US\$4.69/bag (50kg) as of 17 November 2017, marginally down compared to November 2016 and October 2017. In the central region of the country, the average price was US\$4.85/bag, around 2.6% higher than in October 2017 and virtually unchanged year-on-year. The east of the country saw the average price rise by 0.9% month-on-month to US\$5.11/bag, while the western region saw prices fall by 0.6% to US\$4.66/bag. In the south of India the average price fell by 7.0% from US\$5.51/bag in October 2017 to US\$5.13/bag on 17 November 2017.

**China:** Sunsirs Commodity Data Group reports All-Chinese cement prices: 15-16 November 2017 = US\$51.29/t; 17-19 November 2017 = US\$51.79/t; 20 November 2017 = US\$52.17/t.

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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Just because you could, would you want to?

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



I have two young daughters, and apparently each of them has a one-third chance of living to be 100 years old. They have some advantages in the longevity game, not least of which is being female. Females around the world live statistically longer - much longer - lives, possibly due to males in general indulging in riskier behaviours (and smoking and drinking more). The cement industry is now much more concerned with the overall health of its employees than previously, and not just at work. I recently read an interesting article by Jessica Salter<sup>1</sup>, who gave a few useful tips for anyone who wants to increase their chances of living to be 100...

Apart from being born female, and living in the developed world, the most obvious factor in living a long life is your diet. In fact, there is an old saying that 'Most men dig their own graves with their teeth.' Staying away from trans-fats, processed foods and high levels of sugar and salt have all been shown to increase health outcomes. Laying off the booze is obviously a good idea, since alcohol is a proven carcinogen, although various studies suggest that alcohol in moderation may be good for your heart - especially if the alcohol comes in the form of red wine, rich in anti-oxidant resveratrols. Drinking up to a half a glass of red each day has been shown to increase longevity by up to five years (compared to only 2.5 extra years for those indulging in beer and sprits, compared to those who don't imbibe).

Cutting down on consumption of red meat has been shown to reduce a number of types of cancer, while vegetarians who have followed the diet ('lifestyle?') for 17 years can add 3.6 years to their life, according to the Mayo Clinic in Arizona. A diet high in fibre, mostly from beans and pulses, has been linked to a host of health benefits, even if you might lose some friends in the process.

However, it has also been shown that reducing one's overall calorific intake is perhaps the most effective diet-based way to increase longevity, with one long-term study showing that a group that ate 30% fewer calories than a control group lived three years longer (albeit with the downside of feeling continuously hungry for 30 years).

Your genes may also be a powerful factor in your longevity. If you come from a long-lived family (showing perhaps that in general they are less likely to have been struck down by a genetically-based disease), the chances are that you will live a long life yourself. I'm lucky in that both of my parents are still alive, into their mid-80s, while my mother Valerie is one of the record-

breaking Tweed family of Coventry, which at one point clocked-up over 1000 years of birthdays between 12 living siblings (of 16 original brothers and sisters). Of course, unlike friends, you cannot choose your relatives and ancestors!

Talking of family, those who have close family around them - brothers, sisters, children/offspring - also get a boost in lifespan, partly through the avoidance of loneliness, which has been shown to have a detrimental impact on health. Men with a wife who is younger than them also tend to live longer than those married to a spouse of equal age, or to an older woman. Alas, for women the opposite is true, and a younger husband will actually decrease your lifespan.

Staying fit, especially through running, is crucial, and exercise has been described as the 'magic remedy' for a wide range of ailments. Indeed, those who run are less than half as likely to develop arthritis as walkers. Golfers have been shown to live up to five years longer than non-golfers, and those with the lowest handicap gain the most benefit.

Another strong effect on our longevity is our work life. Working hard (but not too hard) can extend our lives - especially if that work involves keeping physically active. A study published in the British Medical Journal showed that delaying retirement by one year led to an 11% lower risk of an early death. Indeed, retirement has been called 'a health and financial disaster for most people.' Retirement itself is among the most stressful of all of life's stressful events. The answer? Either don't retire, or decrease the time spent at work gradually. When 'knowledge leakage' (aka death) is a real problem facing the cement industry, due to an ageing workforce and recruitment/reliability problems with younger workers, having a part-time 'old-timer' around who knows how things really work would be a real bonus for most cement plants.

However, the question that we should all ask ourselves is this: Even if we could all live to 100 years old, would we want to? After all, the additional years that we might gain through living a healthy (and possibly spartan) life are not going to be additional years in our 20s or 30s: they're going to be additional years in our 80s and 90s. As has been said, 'No pleasure is worth giving up for the sake of two more years in a geriatric nursing home in [down-at-heel British seaside resort] Weston-super-Mare.'

<sup>1</sup> The Century Club: How to live to be 100-plus; Jessica Salter, Sunday Telegraph, 1 October 2017





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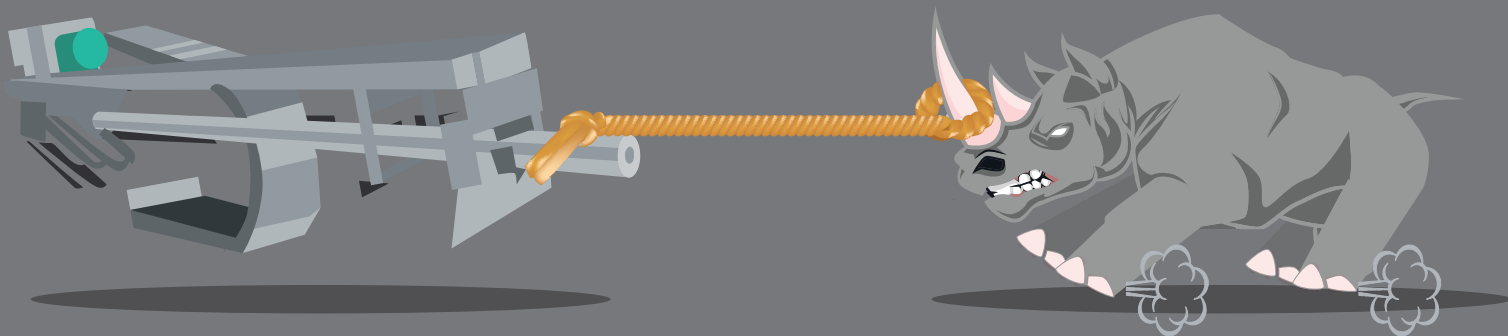
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