



# CEMENT & BUILDING MATERIALS REVIEW

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*Diary Dates*

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## CONTRIBUTIONS

- *The Magazine editorial staff welcome the contribution of experts to enrich the contents of the magazine .*
- *Articles are not to be returned to authors .*
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AUCBM's *Quarterly Cement and Building Materials Review (CBMR)*

**EDITORIAL SCHEDULE FOR 2020**

ISSUE	THEMES	EVENTS
June 2020	<ul style="list-style-type: none"> <li>- Bagging, Packaging &amp; Dispatch</li> <li>- Loaders &amp; Unloaders</li> <li>- Feeder Technology</li> <li>- Bulk Storage and Handling</li> <li>- Storage of fuel</li> <li>- Conveyors, Bucket Elevators</li> <li>- Occupational Health &amp; Safety</li> <li>- Coal Preparation and Firing</li> <li>- Interview</li> </ul>	
* September 2020	<ul style="list-style-type: none"> <li>- Low carbon cement</li> <li>- Concrete</li> <li>- XRF and XRD analysis</li> <li>- Chemistry of cement</li> <li>- Cement additives</li> <li>- Silo Cleaning &amp; Blockages</li> <li>- Silo design consideration</li> <li>- Drive systems</li> <li>- Weighing technologies</li> <li>- Sampling Techniques &amp; Samplers</li> <li>- Interview</li> </ul>	<p style="text-align: center;"><b>AUCBM's 25<sup>th</sup> Arab International Cement Conference and Exhibition (AICCE25)</b></p> <p style="text-align: center;"><b>Riyadh, Saudi Arabia, 1-3 December 2020</b></p>
December 2020	<ul style="list-style-type: none"> <li>- Lubrication Systems</li> <li>- Maintenance in Cement Plants</li> <li>- Repair and welding techniques</li> <li>- Spare-parts Management</li> <li>- Vertical Mills</li> <li>- Crushers</li> <li>- Coolers</li> <li>- Burner Technology</li> <li>- Refractories &amp; testing of refractories</li> <li>- Interview</li> </ul>	

\* September is a bonus issue that will be distributed to the Conference participants

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Deadlines for receiving articles, press releases, or advert materials for 2020 issues are as follows:

June issue: **29<sup>th</sup> May 2020**

September (bonus) issue: **31<sup>st</sup> August 2020**

December issue: **4<sup>th</sup> December 2020**

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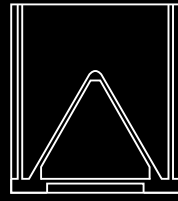
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## ARAB NEWS

### LIBYA

#### Khums Cement plant reopens with more environmentally friendly process methods

The Municipality of Khums has announced the reopening of the Khums Cement Factory of Al Ahliya Cement Company after introducing modern technical modifications to address the environmental pollution emitting from the cement manufacturing process. New filters were installed to limit the emissions of dust and gas that results from the production process. "A-Ahliya Cement Company has taken this step as evidence of its commitment to protecting people living in areas located near the factory against risks of pollution," the municipality stated.

The Libya Observer

### QATAR

#### Qatar National Cement Company reiterates commitment to Qatar's infrastructure development

Qatar National Cement Company (QNCC) has reiterated its continued support to the country's infrastructure development. In this regard, the company is diversifying the product portfolio by adding new products to meet the growing local demand.

This was disclosed by QNCC chairman Salem bin Butti al-Naimi at the annual general assembly, highlighting efforts to 'diversify the production by adding new types of cement to meet the demand of local market and utilise the opportunity of exporting to external markets.

The company had last year said it was looking to annually export as much as 3mn tonnes clinker, especially to Africa, Asia (including India) and Kuwait.

The export markets, which also include Yemen and Iraq, come in view of the company recently operationalising its fifth plant that will enhance the daily clinker production by 5,000 tonnes to 11,000 tonnes.

QNCC is also seeking to optimise the production capacity of washed sand and calcium carbonate to meet the expected local market demand to achieve its targeted goals.

Gulf Times

### SAUDI ARABIA

#### Al Jouf Cement to diversify production

The company wants to produce more types of cement other



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than ordinary Portland

Al Jouf Cement approved an amendment of Article three of its articles of association at its extraordinary general assembly. This essentially means that the company will now produce all types of cement instead of producing only ordinary Portland.

The company's assembly also approved new operating and managing of cement plants.

CW Group

### TUNISIA

#### Carthage Cement obtains new certification

Carthage Cement has obtained a conformity certificate for its products that certifies that its production standards meet the specifications for the European market.

The company said that this new certification will give the Tunisian company access to the European market.

In a statement to the stock exchange, the company added that it would be exporting 150,000 tons of cement to the continent in March.

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### ***AUMUND offers new Conveying and Transportation Solutions for Alternative Fuels***

***Back in July 2019 AUMUND Fördertechnik GmbH began increasing capacity in its engineering team; this signalled the start of new product design in conveying and transportation of alternative fuels. The engineering team has now started the new year with its full complement.***

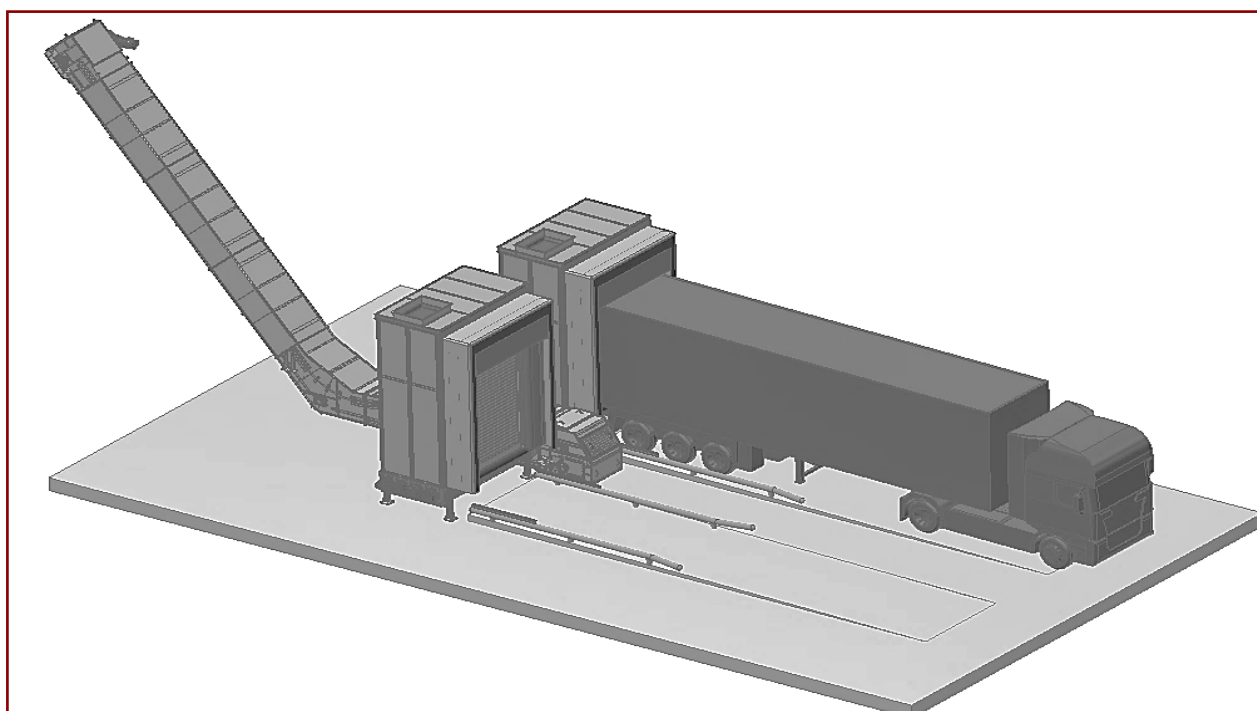
In the early 90s AUMUND made news by taking over Maschinenfabrik LOUISE in Cologne. In 2006 AUMUND also acquired WTW Engineering in Cologne. Both companies have engineering, patents, production and sales relating to rotary discharge machines and drag chain conveyors. The purchase of these companies and their products gave AUMUND the edge in bringing to market discharge systems such as CENTREX® or LOUISE Rotary Discharge Machines and Rotating Rotary Discharge Machines, and in driving the development of these products. The acquisition of the spare parts business of Maschinenfabrik Besta & Meyer in 2014 rounded off the product portfolio at that time.

As AUMUND continues to pursue this strategic path it is now capable of offering an extended range of products for the alternative fuels sector: The offering includes the AUMUND Trailer Docking Station, the AUMUND Moving Floor, and the AUMUND Rotating Screw Discharger for the conveying and transportation of alternative fuels such as wood chips, wood pellets, RDF, sewage sludge, shredded paper and many more.

#### ***AUMUND Trailer Docking Station***

The AUMUND Docking Station is particularly suited to truck unloading with autonomous discharge systems such as walking floors and active or moving bottoms. A separate hydraulic aggregate powers these moving floors so that the unloading of the truck is independent of its traction unit. With the aid of dedusting systems on the Station and a curtain, the discharge effected is largely dust-free. Screw conveyors on the floor of the Docking Station transport the material sideways to an ongoing conveyor. The AUMUND Docking Station impresses with its compact, modular and flexible design.

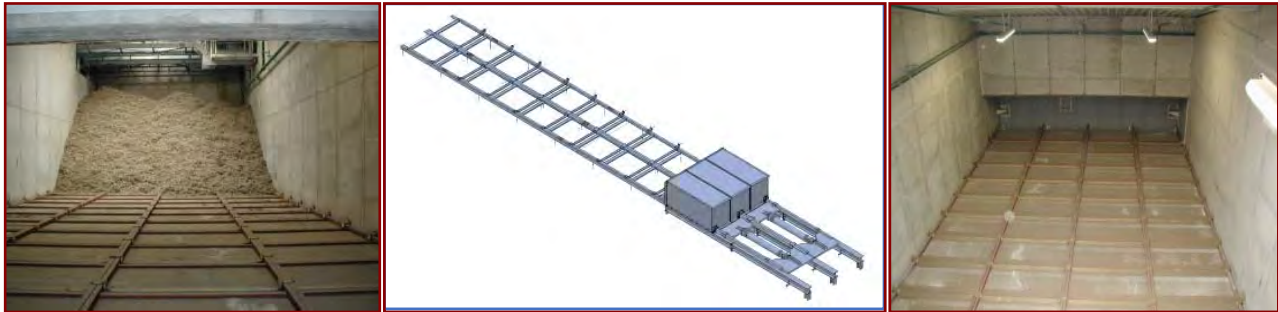
Extensive structural requirements are not necessary. Discharge capacities of 200 m<sup>3</sup>/h with two Docking Stations have already been achieved.



**AUMUND Docking Station (Artwork by AUMUND)**

**AUMUND Moving Floor**

The AUMUND Moving Floor is a reliable unloading system for easy flowing and sticky materials. The Moving Floor consists of a special grating which is individually adapted to the characteristics of the material to be conveyed. The Moving Floor slats are each powered by a hydraulic cylinder, with individual slats retracting below the material in turn, enabling the complete Moving Floor to bring the material forward in the conveying direction. The Moving Floor can be installed either on a concrete slab or on steel. Classical applications for the Moving Floor are pre- and interim hoppers for wood chips and bark, sawdust, rubber waste, plastic rubbish, sludge, coal-tar mixtures, refuse from the paper industry and many more. Discharge capacities of 40 to 300 m<sup>3</sup>/h have already been achieved.



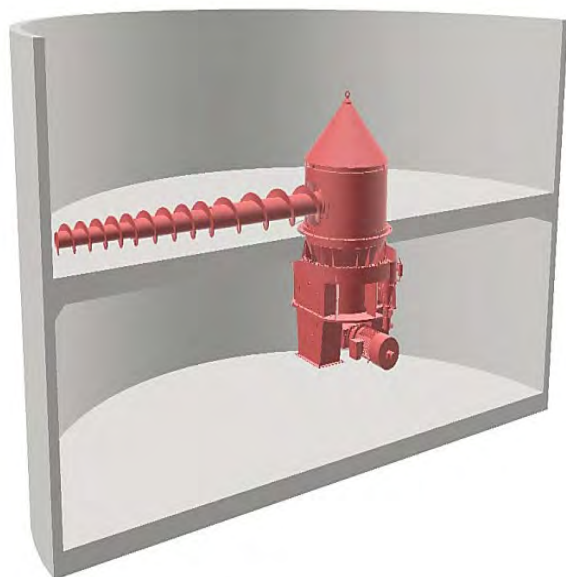
**AUMUND Moving Floor (Photos and artwork by AUMUND)**

**AUMUND Rotating Screw Discharger Type RSD**

The Rotating Screw Discharger type RSD is a discharge system for dry or damp bulk materials which do not flow easily. The Screw Discharger travels over the silo floor by rotating around the vertical axis of the cone, and conveys the material into the chute beneath the cone. The Screw Discharger can be adapted to the individual bulk material by variations in the design of features such as the cladding, the teeth, or the pitch of the screw. Screw Dischargers can be installed in steel or concrete silos. Depending on the material properties and the diameter of the silo, conveying capacities of up to 450 m<sup>3</sup>/h can be achieved. The maximum silo diameter is currently around 25 metres.

**About the AUMUND Group**

The AUMUND Group is active worldwide. The conveying and storage specialists have special expertise at their disposal when dealing with bulk materials. With their high degree of individuality, both its technically sophisticated as well as innovative products have contributed to the AUMUND Group today being a market leader in many areas of conveying and storage technology. The manufacturing companies AUMUND Förder-technik GmbH (Rheinberg, Germany), SCHADE Lagertechnik GmbH (Gelsenkirchen, Germany), SAMSON Materials Handling Ltd. (Ely, England), as well as AUMUND Group Field Service GmbH and AUMUND Logistic GmbH (Rheinberg, Germany) are consolidated under the umbrella of the AUMUND Group. The global conveying and storage technology business is spearheaded through a total of 19 locations in Asia, Europe, North and South America and a total of five warehouses in Germany, USA, Brazil, Hong Kong and Saudi Arabia.



**AUMUND Rotating Screw Discharger Type RSD in a silo (Artwork by AUMUND)**

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### ***State-of-the-Art SRF Production Facility in Germany: Solid Recovered Fuels for an Entire Cement Plant 365 Days a Year***

*B+T uses Lindner shredders to supply Deuna Zement GmbH with energy*

*The two major players in recycling and waste processing: Lindner-Recyclingtech and the B+T Group have been partners for many years, successfully working together on many important projects. Now they are delighted to announce their latest project: a brand-new SRF production facility with the most modern technology in the whole of Germany. Developed and operated by the B+T Group, the facility is located on the premises of Deuna Zement GmbH and supplies the cement production plant – important in the Thuringia region and beyond – with fuel from sorted and commercial waste in optimum, homogenous quality – 24/7, 365 days a year. One Lindner Jupiter 3200 for primary shredding and three Komet 2800 HP for secondary shredding are in operation there. The latter are part of the new Series 2 – a recently launched Lindner innovation.*

**Spittal an der Drau/Austria and Deuna/Germany:** Following the ground-breaking ceremony in mid-2017, regular operations could begin at the large facility as early as April 2018 – an incredible team effort by B+T and Lindner that was duly celebrated with a festive inauguration in September 2018.

#### **The challenge: a complete processing line just in time**

When installing the shredding and sorting technology, it was of paramount importance to avoid disrupting operations at the adjoining cement plant as much as possible. Since the rotary kilns have to be fed constantly, the best time for the installation was during the overhaul phase, when maintenance and repair work is carried out. An ambitious target that was successfully achieved thanks to systematic planning and perfectly timed implementation.

#### **One of Europe's most modern plants: The B+T Group's SRF production facility in Deuna**

The Bohn group's eighth facility – with a total of over twenty Lindner machines in operation – covers an area of 25,000 square metres below the cement plant, has a maximum throughput of 250,000 metric tons per year and a storage facility for approximately 4,000 metric tons of finished goods. Pre-sorted waste is processed at the plant, especially non-recyclable post-consumer packaging and plastic film, as well as rubber and textile waste, which also cannot be mechanically recovered. With the full supply contract, the newly founded operating company B+T Deuna GmbH has agreed to supply the cement plant 24/7, 365 days a year. For quality assurance purposes, the solid recovered fuel is constantly tested for its burning properties using near-infrared technology (NIR). PVC with chlorine has no place in fuel and is safely removed.

Likewise, the calorific value and humidity are permanently monitored. The dosage is adjusted in real time and independently of external laboratories, guaranteeing continuously optimum fuel quality.

However, Deuna has not only invested in modern and high-quality engineering: a tour of the production unit, office and ancillary buildings reveals that the best system technology available has also been used for fire protection, establishing reliable safety standards.

#### **The backbone of the facility: the 420-metre-long pipe conveyor**

This striking feature enables the premium solid recovered fuels from the SRF production facility to reach their destination in the cement plant: the 420-metre-long pipe conveyor connects both facilities and feeds the rotary kilns directly with the solid recovered fuel. It's also the most remarkable architectural element outdoors. 'The pipe conveyor is visible from afar – and rightly so, because it's the facility's backbone,' explains Matthias Pitz, the B+T Group's CTO. Together with Henning Bruns in the team of experts, he is responsible for the design, planning, construction and monitoring of the Deuna plant.



**The 420-metre-long pipe conveyor at B+T Deuna connects the SRF facility with the cement works, making it crucial to the plant's success.**

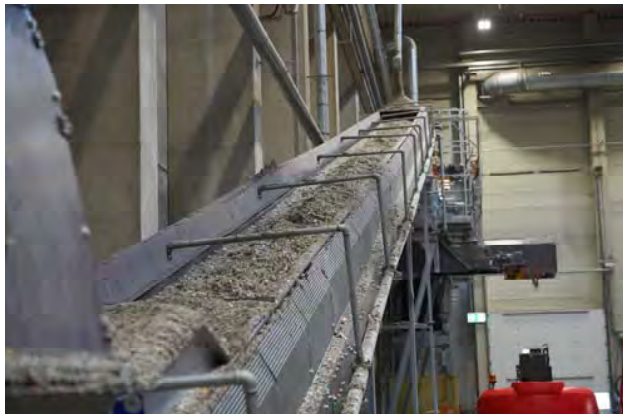
#### **Innovation starts with the goods' arrival**

Processing at the facility starts with the weighbridge. That's where the B+T Group's expertise and innovativeness first become evident: the weighbridge and controls are fully automated. Each supplier receives a slip with a barcode to log themselves in at the weighing terminal. Once the cargo's material and destination have been authorised, the supplier is assigned an unloading space on the premises and is given access. Bale goods account for seventy per cent of all deliveries, while the rest is loose and is brought directly to the 'input unit'. This is where the material is combined to obtain the perfect SRF product. The ultimate aim is to feed as homogeneous a fuel as possible into the plant, a fuel that has the optimum calorific value for the plant and allows for stable operation – continuously.

#### **Required below, delivered above**

The material mixture is prepared for further processing with an environmentally friendly, electrically powered crane grabber. 'This is where the primary shredder Jupiter 3200 comes into play,' says Matthias Pitz, explaining the further processing steps. After shredding, the fuel particles are transported to the processing unit, which also houses an optical sorting system. Here, the material is classified using near-infrared devices and wind sifters. Metals and other recyclable materials, which might still be present in the feed material, are removed and sold, while the useful material for SRF production is secondary shredded with the Series 2 Komet 2800 HP.

The fuels are then transferred to the storage area, which Deuna Zement can access via a sophisticated, fully automated system 24/7, 365 days a year, and from where it can request the required quantity of fuel for the rotary kilns at any time of day or night. This system offers the recipient, i.e. the cement plant, the greatest possible flexibility and safety, as the necessary material is requested autonomously: 'It's the cement plant itself that controls the material flow from the storage area into our receiving container, which is installed right next to the rotary kilns,' explains Operations Manager Ronny Hanstein. 'As soon as material is removed from the storage area, it is automatically restocked by the crane. It has to overcome a difference in height of approximately 35 metres,' Hanstein continues: 'so when material is needed down here, we deliver it up there.' With this system, up to 30 metric tons of solid recovered fuels can be transported per hour.



**incineration in the cement plant.**



**The best SRF quality is essential for optimum co-**

### **Jointly developed: the new Komet Series 2**

The Lindner facility components play a vital role in the Bohn group's consistently high SRF quality. Matthias Pitz explains the advantages of the Lindner machines: 'In our experience, the Komet secondary shredders are machines that operate reliably 24/7 and always produce the perfect output material, i.e. the desired quality in the required quantity.' At the new plant in Deuna, the B+T Group is now using the optimised Komet Series 2 for the first time. Many improvements to this new machine series are the result of feedback from Lindner's long-standing client. 'The input and practical experience of the B+T Group, which is known in the industry as a fine-tuner, out-of-the-box thinker and pioneer, are highly appreciated and have had a considerable impact on the further development of our shredders,' confirms Stefan Scheiflinger-Ehrenwerth, Product Manager at Lindner.

According to Scheiflinger-Ehrenwerth, the crucial secondary shredder improvements implemented by the Austrian shredder specialist after a joint innovation workshop are: exchangeable wear plates, simplified access to machine components for maintenance and repairs, a new generation of frequency converters, anti-vibration electrical cables and optional versions for special applications.

### **The essentials: productivity and reliability**

The combination of powerful motors, resistant belt drive and robust components in the Lindner shredders have proven their worth time and again and guarantee smooth operation with minimum downtimes. Matthias Pitz particularly appreciates the Lindner shredders' resistance to non-shreddables. That's very important since waste contains more problematic substances now than ever before. One reason is consumers' waste separation behaviour which leaves much to be desired, as a study by the University of Leoben in Austria shows. For example, sizeable metal parts can be found in plastic waste, and organic waste is disposed of in the general rubbish bin or in waste paper bins.

To safely separate this material and turn it into high-quality fuels, a considerable amount of engineering technology is required that Lindner and Bohn provide together.

'Lindner's robust shredders are made for difficult material flows containing non-shreddables and foreign parts,' confirms Matthias Pitz. And if anything does get stuck, the hydraulically operated, inward-opening maintenance door allows for safe maintenance access to the cutting chamber and the quick removal of non-shreddables. The cutting gap between the counter knives and the shaft knives in the Komet Series 2 can even be adjusted during machine operation. The benefits are obvious, as Stefan Scheiflinger-Ehrenwerth explains: 'By adjusting the cutting gap, you can counteract the natural wear and tear on the knives, meaning that they have a longer service life and the high quality of the output can be maintained for a very long time.'

### **The cherry on the cake: reliable operation 365 days a year**

Production at the Deuna cement plant takes place in shifts – 24/7, 365 days a year. Which means that the supplier of the solid recovered fuels has to deliver non-stop, too. To avoid potential faults and hence downtimes wherever possible or to fix them without delay, Lindner offers a special analysis tool for rapid diagnostics and troubleshooting that enables visualisation on the machine itself and detailed monitoring of all processes. The touch panel displays error messages clearly and concisely, meaning that faults and defects can be localised immediately and promptly



repaired. ‘With this transparent visualisation the user has a complete overview of absolutely everything’: Matthias Pitz is full of praise for this well-engineered system that is extremely user-friendly too since it not only monitors but also identifies optimisation potential that can mostly be implemented straight away and does not require any special expertise.



**Lindner offers a special analysis tool for quick diagnostics and troubleshooting, enabling visualisation on the machine itself and detailed monitoring of all processes.**

Both companies find their cooperation extremely fruitful for clients who opt for an SRF production facility for the supply of premium alternative fuels, which is why both the B+T Group’s Operations Manager and Lindner’s Product Manager are happy to predict that: ‘As reliable partners we are bound to continue to work together on future projects.’

**More information:**

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### 6<sup>th</sup> Alternative Fuels Symposium - Review

*Global alternative fuels community meets in Duisburg, Germany, on 23 – 25 September 2019 to discuss the building materials industries' potential for CO<sub>2</sub> reduction*



From 23 – 25 September, 2019, MVW Lechtenberg & Partner gladly welcomed almost 140 members of the alternative fuel's community from 36 different countries at the 6th Alternative Fuels Symposium, taking place at Wyndham Duisburger Hof Hotel in Duisburg, Germany. The key objective of the symposium is to show the cement and related industries their potential of improving sustainability by using alternative fuels, and thereby significantly reducing their climate impact. In the last 6 years, the symposium has become a leading international event in the field of processing and utilization of alternative fuels, especially in the cement industry.

An optional Field Trip on 23 September took place at HeidelbergCement plant Ennigerloh. The plant replaces more than 75% of fossil fuels with alternative fuels such as RDF, tires and liquid fuels in compliance with the highest emission protection regulations and is one of the most efficient German cement plants. On site, the participants had the opportunity to get insights into the plant's tire feeding and RDF storage area from a best case example.

Topics from the presentations given on 24 and 25 September included amongst others: sustainable development and CO<sub>2</sub> reduction potential worldwide, best practices in cement emission reduction, innovations in RDF production and production equipment, fire protection in RDF plants, country reports and case studies on developing and operating successful waste to fuel projects.

In the highest rated presentation, Florian Salzer from Wietersdorfer & Peggauer Zement GmbH reported on the company's efforts to significantly reduce SO<sub>2</sub>, NO<sub>x</sub> and mercury emissions through the installation of a SNCR system, renewal of the baghouse filter and the erection of a regenerative thermal oxidation system. CO<sub>2</sub> reduction will mainly be achieved by implementing low-CO<sub>2</sub> fuels, using partly pre-calcined alternative raw materials, developing of cements and binders with low clinker content, as well as the continuous reduction of the electrical energy consumption and electricity generation with company-owned hydropower plants.

A technological innovation has been presented by Georgios Koufodimos from Herhof GmbH – Helector SA. In his paper "Power Plant Post-Combustion Carbon Dioxide Capture", he explained the enzyme-accelerated CO<sub>2</sub> capture through carbonic anhydrase. The new technology uses salt solutions rather than the toxic solvents used by other capture technologies. It has been successfully tested in a 10 t/d pilot plant in Canada, with 2,500 h of operation. Planned are a pre-commercial plant with 16 t/d in 2022, and for 2023 a commercial plant with 30 t/d. According to Koufodimos, the application in the cement industry is feasible.

Dr. Arif Bashir from DG Khan cement opened the second day of presentations with his "Overview of the Cement Industry in Pakistan & DG Khan's RDF Activities". Dr. Bashir described the use of alternative fuels by referencing to DG Khan's RDF processing plant at Khaipur cement plant. The plant's success story began in 2008 with first feasibility studies regarding RDF production from household wastes from landfills. In the course of the



following years, DG Khan successively installed various equipment, including pre- and post-shredders for RDF, biomass and tires, screens and metal separators. The company was able to cover up to 31.4% of thermal energy requirements in the calciner with alternative fuels without forfeiting production loss. Dr. Bashir furthermore explained that specific thermal energy consumption increased due to the high humidity of the alternative fuel mix. In comparison to coal, lower NO<sub>x</sub> emissions were found with alternative fuels. With coal, NO<sub>x</sub> levels at the exit of the heat exchanger were around 650 ppm, with tire chips (TDF) 600 ppm, and with chicken manure 350 ppm.

Dr. Bashir further highlighted the effects of various alternative fuels on the clinker composition and on the overall process management. His strong recommendation from experience was to gradually introduce and gradually increase alternative fuels, combined with close scientific monitoring of the process management and qualities.

In the exhibition area, delegates had the opportunity to discuss specific topics with a selected number of exhibitors, mainly equipment suppliers, which allowed for great networking opportunities.

During the symposium, the winners of this year's Alternative Fuel Award competition have been honoured and presented their outstanding projects of alternative fuel use, implementation or innovation to the audience. The winning projects were:

1<sup>st</sup> Prize: Arabian Cement Company, Egypt: "Alternative Fuel Case Study"

2<sup>nd</sup> Prize: Simuma Cement, Part of Intercement Group, South Africa: "5 Years Evolution for a Sustainable Waste Disposal"

3<sup>rd</sup> Prize: Process Solution, Canada: "Waste Fuels Information Management System (WFIMS) for Geocycle".

The 7<sup>th</sup> Alternative Fuels Symposium will take place from 8 – 10 September 2020 at Wyndham Duisburger Hof Hotel in Duisburg, Germany. Delegates will have the opportunity to join a Field Trip on 8 September and – after a successful re-introduction in 2019 – to participate in an intensive one-day Alternative Fuels Workshop. More information can be found at [www.lechtenberg-partner.de/symposium](http://www.lechtenberg-partner.de/symposium).

Context: The global cement industry is responsible for around a tenth of anthropogenic CO<sub>2</sub> emissions. In 2015 alone, the industry generated around 2.8 billion tonnes of CO<sub>2</sub> - a greater share than any country except China or the US. Thus, it has the possibility to substantially improve its sustainability. One way this can be achieved is by increasing alternative fuels use in order to avoid fossil CO<sub>2</sub> emissions. Depending on substitution rate, quantity and composition, using alternative fuels can cut overall emissions by 25% and CO<sub>2</sub> emissions by approximately 50%. A great potential, considering the urgency of emission reductions according to the Paris Agreements and the increasing demand for cement worldwide.

About the company: MVW Lechtenberg & Partner is one of the world's leading consulting firms in the field of efficient and sustainable use of alternative fuels. With a vast experience and extensive care for the environment, the company influences and enables a wide range of industries worldwide to reduce their carbon footprint.

MVW Lechtenberg & Partner develops concepts for the processing of domestic waste and other wastes into alternative fuels, checks the environmentally relevant and process specific influences on the cement, lime and power production, plans adequate preparation plants and supervises the ongoing production and the continuous input in cement and lime production plants – worldwide.

***LOESCHE hosted the eighth Technical Seminar  
in November 2019 in Düsseldorf***



**On the 13<sup>th</sup> and 14<sup>th</sup> of November 2019, the LOESCHE Training Center opened its doors for the eighth Technical Seminar in Duesseldorf. The completely sold out event offered a platform for sharing knowledge and exchanging experiences.**

This is already the eighth time the LOESCHE Training Center in Duesseldorf has held the open Technical Seminar. The event's motto was "resource-efficient strategies in cement production" and was primarily aimed at process and maintenance personnel in the cement industry. The focus was on the exchange of expert knowledge and practical experience.

A total of 65 visitors and contributors from 22 nations including Macedonia, Burkina-Faso, Saudi Arabia, Syria, India and Bangladesh took part.

The event began on the 12<sup>th</sup> of November with an informal evening of introductions in the Media Harbour in Duesseldorf. The seminar itself took place on the 13<sup>th</sup> and 14<sup>th</sup> of November.

The following themes were presented and discussed:

Dr. Christina Fleiger from the VDZ (Verein deutscher Zementwerke, the association of the German cement industry) presented an objective overview of the state of research of CCUS technologies (Carbon Capture, Utilisation and Storage) and the possibilities for their use in industry.

Dr. Erwin Schmidl, WhiteLabel-TandemProject e.U., spoke on the use of alternative fuels in cement production. He demonstrated the challenges, impacts and solutions stemming from the use of alternative fuels in the cement industry.

Following this, Taís Mazza Joudeh introduced LOESCHE's first experiences with waste conditioning plants in the USA.

Dr. Stefan Kern, Managing Director of A TEC in Austria, spoke on chlorine bypass systems and an integrated approach for waste-free reworking of bypass dust.

LOESCHE's Dr. Roland Aeckersberg explained, by way of numerous practical examples, how coal grinding plants can be run as safely and risk-free as possible.

The first day's closing keynote lecture, delivered by Dr. Winfried Ruhkamp, offered an interesting glance into the near future. He presented the promising results of LOESCHE's experiments on grindability with innovative cement composites in vertical roller mills.

The first seminar day ended 170 metres in the air, at Duesseldorf's Rhine Tower, where participants enjoyed Japanese cuisine and the astonishing view from Germany's highest restaurant.

The second day began with a lecture on wear, repairs and the management of spare parts. Hans-Georg Stengel provided insight into his long experience working in LOESCHE installation supervision.

An introduction to the basics of process technology in running a grinding plant was given by Stefan Tübergen, a process engineer at LOESCHE. In a second lecture that afternoon, he spoke on measurements and control loops in a grinding plant.

In his lecture, Dr. Dorival Tecco clearly demonstrated how grinding productivity can be significantly improved with a solid understanding of the basics of wear dynamics.

Robert Koert from LOESCHE Customer Service then presented a project on the successful overhaul and modernisation of two LM 28.2 type LOESCHE mills, which had been in operation for more than 40 years.

The second day also ended with a look at the near future. In his keynote lecture, LOESCHE's Chief Digital Officer Ralph Viebrock presented a state-of-the-art approach to digital maintenance planning.

The so-called "World Café" has already become tradition as a recurring part of the seminar: in modern, interactive short workshops, all participants and speakers had the chance to discuss topics and questions in a relaxed atmosphere. Under the motto "everybody's an expert", these short discussions allowed for an equal exchange of personal experiences and knowledge.

The LOESCHE Technical Seminar was a great benefit for all who participated. The feedback from attendees turned out accordingly. "The seminar on innovations for vertical roller mills was a great help. We'll come back with more engineers and technicians in the future. And many thanks for the preparation, organisation and hospitality," said one participant from the Cement Company of Northern Nigeria.

Organisers Theodora Bruns und Dr. Regina Krammer also found this seminar to be the most successful ever. "On top of interesting lectures and the chance to bring in personal experiences, we were also able to discuss solutions together and make a great many contacts. The quality of the seminar wasn't just down to the expertise of the speakers but also the active participation of all those who attended the programme. We're already looking forward to the upcoming LOESCHE Seminars in 2020," said Regina Krammer.



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### **EU Clears Synthomer Takeover of Omnova on Conditions**

The European Union, represented by the European Commission, Brussels, Belgium has approved of Synthomer plc, London, Great Britain's takeover of Omnova Solutions, Beachwood, Ohio, USA. Omnova is producing various additives and organic dispersions and latices as well as laminates for several industries. In order to accommodate the EU's concerns, Synthomer will have to spin off its (small) latex activities in Germany prior to receiving EU approval. According to Synthomer a number of expressions of interest for the latex unit exist already. One more ruling by the Turkish antitrust authorities is expected in early February. The transaction value is 725 mio Euro, Synthomer expects completion of the deal within the first quarter of this year.

source: Drymix Newsletter 232/2020: 04/02

### **Bette Acquires Waterproofing Specialist Oxiegen**

Sanitary ware producer Bette GmbH & Co. KG, Delbrück, has recently taken over the specialty waterproofing and adhesives company Oxiegen, Bad Lippspringe, both Germany. Oxiegen produces waterproofing materials and -stops, sound absorption products, de-coupling mats for floors and walls and specialty tile adhesives and flooring compounds. Bette is a producer of design bathroom sanitary ware, such as bathtubs, shower troughs, sinks and bathroom furniture. According to the management of Bette, this acquisition is sort of a backward integration, since Oxiegen has supplied Bette with auxiliaries before, but also as a chance to become a system solutions provider for bathroom architecture and installation. Both companies will continue to operate individually.

source: Drymix Newsletter 232/2020: 04/02

### **Saint Gobain Acquired the CTA Division of Celima**

Saint-Gobain SA, Paris, France, recently announced it had completed the acquisition of the drymix mortars division of Celima (formerly Ceramica de Lima) Corporación Cerámica S.A., Grupo Celima-Trebol in Lima, Peru. Celima operates three plants in Peru, located in Lima, Arequipa and Trujillo. The drymix mortar division of Celima generated sales of 25 mio Euro with about 100 employees back in 2018. Saint Gobain has already been a major player in Peru's glass and plasterboard markets and reaches out now into the building materials market. A transaction value was not disclosed by either party.

source: Drymix Newsletter 232/2020: 04/02

## The EU ETS and cement: How did we get here?

*This article offers a data-backed review of the EU Emissions Trading Scheme (EU ETS) and its impact on the cement industry in Europe, based on a recently-published report by CemBR. The report examines all countries and integrated cement plants within the EU ETS. The analysis was carried out with reference to detailed data since the onset of the EU ETS back in 2005.*

**By: Claudia Stefanoiu, CemBR, United Kingdom**



Above: Claudia Stefanoiu, Head of Research at CemBR, a data, research and intelligence provider in the global cement sector. CemBR’s team consists of several cement-related professionals with a wide range of expertise. Its mission is to provide the most accurate, insightful and data-driven cement related intelligence in the market.

The EU ETS has been operational for almost 15 years. In the early years of its application, carbon pricing was high, but the cement sector had more than enough free allowances to cover its operations. Later, the situation became even more comfortable for the sector. CO<sub>2</sub> prices were low and the sector retained a significant surplus of free allowances. However, in the last years things have become more interesting.

CO<sub>2</sub> emissions permit prices began to rise in early 2018, reaching Euro28.57/t in August 2019. At the same time, as cement demand had recovered in certain parts of Europe, an increasing number of cement plants were confronted with the need to purchase CO<sub>2</sub> credits at the increased pricing levels (many expect prices to keep increasing) or to consume stocks of accumulated

credits held by the company. In addition, Phase IV of the EU ETS is now being developed, with future allowances (beyond 2020) expected to be based on lower production activity levels for most of the countries and their respective cement plants.

To make things even more complicated, it is now generally accepted that the cement sector has not met the targets set out by the EU ETS. An increasing number of large cement companies are raising the climate change issues to the top of their corporate agenda.

### Cement process and CO<sub>2</sub> emissions

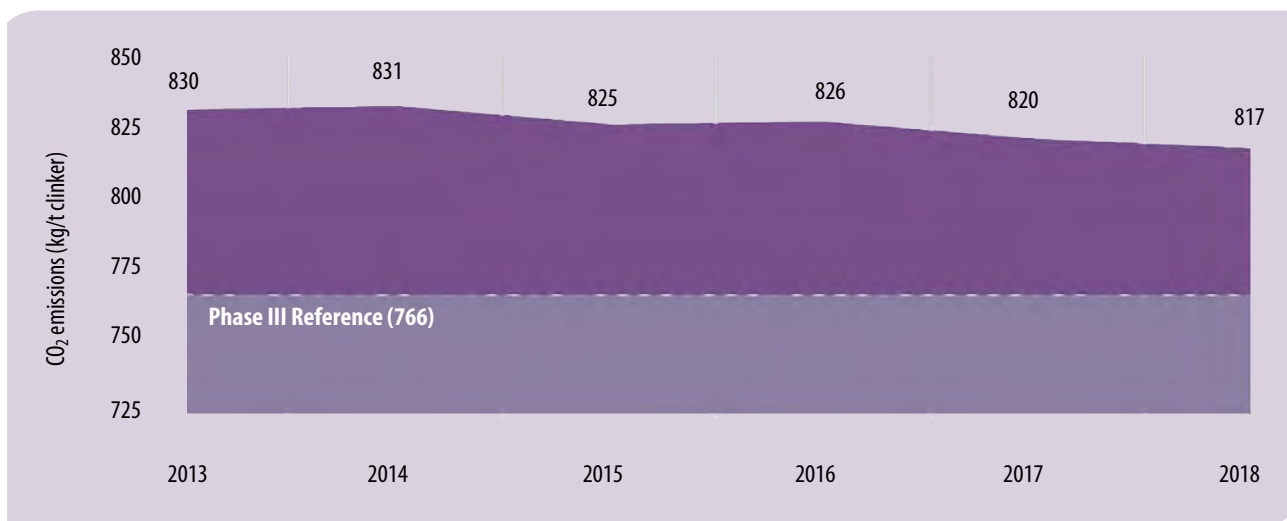
Around 60% of CO<sub>2</sub> emissions from the cement sector emanate from the decarbonation step when making

**Table 1: The largest variance in CO<sub>2</sub> emissions of cement plants in the EU ETS is due to the fuel requirements of different process technologies.**

Source: CemBR.

Process	Capacity (t/day)	Dimensions (m)	Feed H <sub>2</sub> O (%)	Energy Consumption (MJ/t clinker)	Energy Consumption (KCal/kg clinker)
Wet	200 - 3000	Ø = 3.0 - 7.0 L = 100 - 220	25 - 45	4500 - 7500	1080 - 1800
Semi-dry	500 - 2000	Ø = 3.5 - 5.0 L = 55 - 75	12 - 17	3300 - 4200	800 - 1000
Dry (4/5 stage Preheater)	500 - 4500	Ø = 3.0 - 6.0 L = 40 - 105	0.5	3000 - 4200	710 - 1000
Dry (4/5 stage Precalciner)	1500 - 13000	Ø = 3.5 - 6.0 L = 60 - 105	0.5	2900 - 4000	690 - 950

**Figure 1: EU ETS CO<sub>2</sub> emissions per tonne of clinker (2013 - 2018).**  
**Source: CemBR.**



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**Cement process and CO<sub>2</sub> emissions**

Around 60% of CO<sub>2</sub> emissions from the cement sector emanate from the decarbonation step when making clinker. The remaining 40% of emissions are due to burning the fuels needed to heat the kiln up to 1400°C to achieve clinkerisation. While the decarbonation component of the emissions is quite stable across plants at around 520-550kg of CO<sub>2</sub> per tonne of clinker,

the fuel component varies significantly depending on the type of fossil fuel, the use of alternative fuels and their biomass content.

The various plant technologies currently operating in Europe significantly impact the fuel requirements and thus the CO<sub>2</sub> emissions due to combustion.

**Working the system?**

All the phases of the EU ETS have so far been characterised by what many would describe as over-generous allowances of CO<sub>2</sub> emissions credits for the cement industry, especially in the first two phases. The carbon pricing history, coupled with the more than adequate allowances (with the gap between

**Table 2: Common alternative fuel calorific values and their average biomass content.**

**Source: CemBR.**

Alternative fuel	Calorific Value (GJ/t)	Biomass content (%)
Used tyres	28	30
Waste oil	30	0
Paper	5	100
Plastic	23	0
Animal meal	18	100
RDF	18	50
Solvents	25	0
Sewage sludge (wet)	3	10
Oil sludge	5	0
Others	18	50



# What can pasta teach us about filtration?

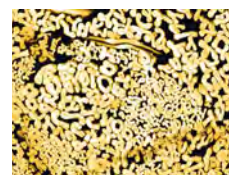


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free allowances and verified emissions increasing significantly after the financial crisis and the resultant decimation of cement production in most of Europe), may have led producers to actions that were not always supportive of lowering CO<sub>2</sub> emissions per tonne of clinker. Even in Phase III, when the benchmark of 766kg of CO<sub>2</sub> per tonne of clinker was adopted, the allowances were broadly adequate to keep the cement players producing at no additional cost. CemBR estimates that, as a result of this, CO<sub>2</sub> emissions per tonne of clinker fell by just 0.4%/yr between 2005 and 2018. This rate was consistent across all phases of the EU ETS.

Some suggest that the above factors have also conspired to induce a financial bonanza for various cement producers, who have either sold surplus credits for cash or banked them (after Phase II) for future use.

As CO<sub>2</sub> credit prices began to increase from 2017, they became more of a financial consideration for cement producers than an incentive to reduce CO<sub>2</sub> emissions. The abundance of credits coupled with the high prices have allowed many cement producers to keep uneconomical plants open by way of exporting, thus edging production just above the 50% threshold whereupon they retained full allowances. One might argue that the EU ETS had the exact opposite effect on cement producers than the one envisaged by its advocates.

**The alternative fuels conundrum**

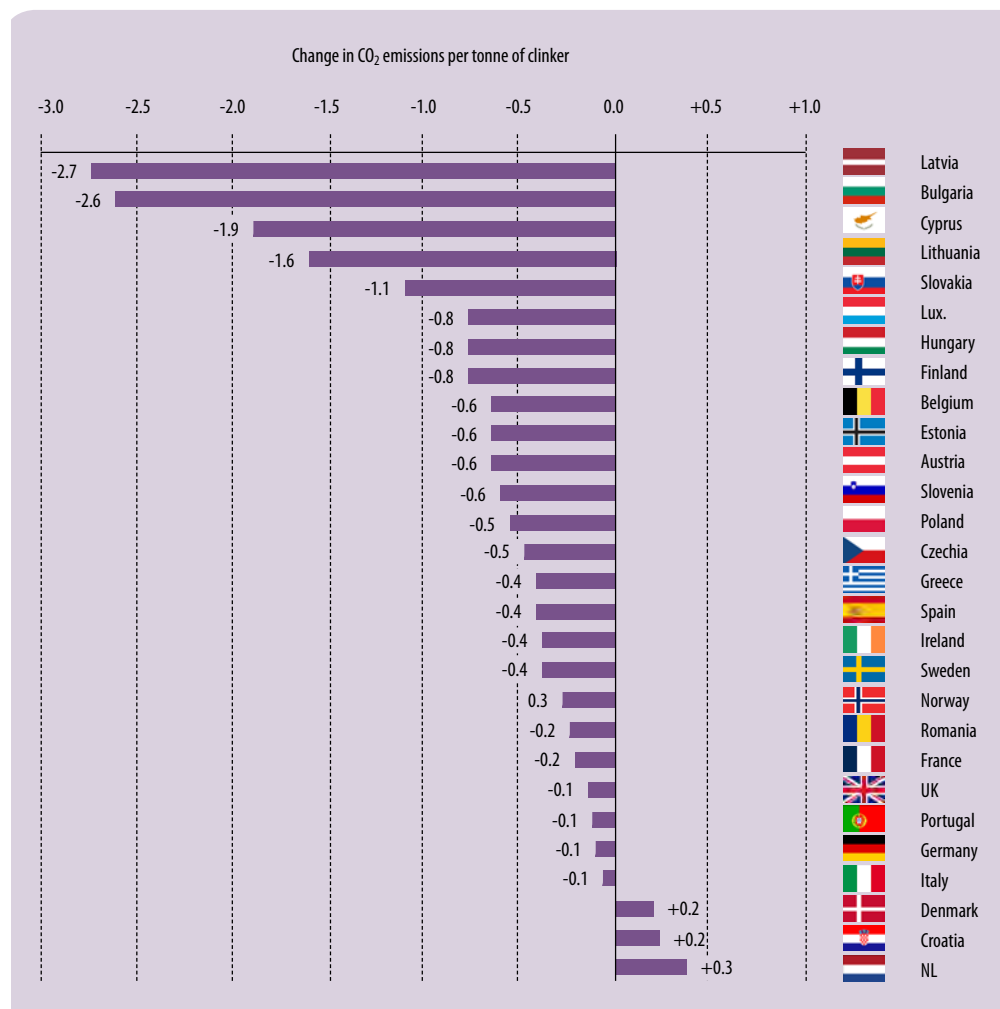
A proud achievement of the European cement industry during the period of the EU ETS (and even before its introduction) has been the increasing replacement rate of alternative fuels. By 2018, it is reported that the industry has reached an overall substitution rate of 44%, up from 5% back in 1990.

**Figure 2:** Rounded long - term compound annual growth rates (CAGR) of CO<sub>2</sub> emissions (kg/t of clinker) by country in the EU ETS . Lux = Luxembourg NL = Netherlands.

**Source:** . CemBR

**Note:** For all countries, the CAGR reflects the period 2005 - 2018 except for those countries that joined the EU ETS later or had inconsistent reporting in the early years

- Bulgaria = 2007 - 2018
- Romania = 2007 - 2018
- UK = 2008 - 2018
- Norway = 2008 - 2018
- Croatia = 2013 - 2018



Indeed, this is an achievement not seen anywhere else in the world. However, as alternative fuels were on the rise the per tonne of clinker carbon emissions have made only minimum advancements. The CemBR report identifies two factors that contribute to this paradox. The first refers to the ‘accounting’ of CO<sub>2</sub> emissions under the EU ETS. It is only the biomass content of alternative fuels that is not taken in the tally of verified emissions. Of course, not all alternative fuels have high levels of biomass. So, if a cement plant increases its alternative fuels usage by, for example, burning oil sludge, it gets no recognition from the EU ETS. However, it does improve its cost structure significantly.

The second factor refers to the inevitable (as shown by real life data) increase in the fuel consumption per tonne of clinker produced as alternative fuels are introduced on a cost-driven basis and not on a CO<sub>2</sub> reduction basis. The high moisture content of RDF for example, unless removed prior to entering the kiln, increases fuel consumption.

Consequently, the alternative fuels success story is true in financial and environmental / waste management contexts, but not so much in terms of reducing CO<sub>2</sub> emissions.

### Leaders and laggards

CemBR identified that the variability between all 28 EU ETS member states in terms of CO<sub>2</sub>/t of clinker is substantial. Three of the 31 EU ETS member states have no integrated cement plants and thus are not relevant here. The myriad reasons behind this divergence are explained in detail in the CemBR report but suffice to say that one of the main reasons for the discrepancy in performance is wet to dry process upgrades. This results in significant overall reduction in CO<sub>2</sub> emissions. Smaller countries with a few plants (or even just one plant) tended to be affected by this disproportionately. It is not possible to pinpoint accurately the impact on CO<sub>2</sub> emissions from these upgrades. However, CemBR estimates that a large proportion of CO<sub>2</sub> emission reduction comes from step technological changes, not micro-process improvements.

### Other key findings from the CemBR report

The data- and analysis-driven insights from the report cannot be included in this short article but as an indication some further key findings include:

- The CO<sub>2</sub> intensity variation between the 28 EU ETS member states is significant, ranging from

750kg/t of clinker to 1085kg/t of clinker;

- A total of 52 integrated cement plants in the EU ETS closed between 2005 and 2018;
- The 2018 activity level of each remaining plant shows that several are producing at a rate close to or above their Historical Activity Level (HAL), the median clinker production rate between 2005-2008. This means they are now in a CO<sub>2</sub> permit deficit. Others still operate at very low levels but secure free allowances;
- 2018 was the first year that the industry presented a deficit of CO<sub>2</sub> credits. This is expected to widen further in 2019 and 2020;
- EU ETS has been generous with CO<sub>2</sub> allocations for the cement industry, resulting in inconsistent behaviours between the various cement producers. Reducing CO<sub>2</sub> emissions per tonne of clinker has not been at the top of corporate agendas;
- The variation between northern and southern Europe is significant, with the so-called ‘olive line’ separating two very different CO<sub>2</sub> outcomes;
- There are eight types of country profiles regarding the CO<sub>2</sub> impact depending on the combination of domestic sales, regional sales, imports, exports (and their destination or source);
- The financial impact of carbon credits is significant in the industry. Simulations suggest that earnings before interest, tax, depreciation and amortisation (EBITDA) margins vary from 50% to -16% depending on the combination of sales, imports, exports, alternative fuels and the plant’s actual capacity utilisation rate.

### Looking forward to Phase IV

CemBR understands that, at the time of writing, the EU ETS Phase IV implementation details are still being refined. However, the findings from this report lead us to pose some questions for Phase IV to which cement producers will want answers:

- What will the new benchmark for CO<sub>2</sub> be per tonne of clinker?
- Will there be ‘carbon leakage’ protection in Phase IV? (not available for previous phases)
- If there is a ‘carbon leakage’ protection mechanism, how will it be implemented? A blanket CO<sub>2</sub>

## *How to build a more climate-friendly cement industry?*

**By: Turkish Cement Manufacturers' Association (TCMA), Turkey**

As you know, since cement industry is continuously researching ways to improve the quality of its products and reducing its environmental impact, it dedicates both significant time and resources to innovation projects across a broad range of areas. In this context, having an aim to improve our sectoral environmental performance, reduce CO<sub>2</sub> emissions and improve energy efficiency, new innovative projects range from carbon capture and reuse in clinker manufacturing, development of low carbon cements and new binders and innovation in both concrete production and applications will help us to improve cement image in the eye of public. A multi-pronged approach is needed – with R&D playing a crucial role.

Today; Turkish Cement Manufacturers' Association (TCMA) R&D Institute which was established under a UNIDO Project has a valuable reputation of being the largest research center in Turkey expertise on Cement, Concrete, and Hydraulic Binders by going beyond the expected services, continuously evolving and developing its quality and scope for over 40 years. TCMA R&D Institute staff and the laboratory facilities have extended its services to all of the producers and users of cement and concrete in Turkey and the World as quality control testing, research and development, consulting, earning are reputation for high quality and unbiased work. Chemical, physical, mechanical and mineralogical properties of cement and related raw materials, concrete, chemical & mineral admixtures, fuels & alternative fuels” can be tested by using European, ASTM, ISO and National standards, special validated test methods and scientific principles.

Nowadays, the cement industry is constantly innovating to help its emissions reduction targets and is willing and able to provide policy-makers with advice on how to develop and build a sustainable society. Therefore, most R&D institutes have already implemented major efficiency improvements like reducing GHG gases substantially.

Therefore, TCMA R&D Institute plays an active role on national and international projects especially in EU Horizon 2020 Research and Innovation Programme becoming partner in two different H2020 projects. One of them is “Carbon Capture Technologies” in the scope of Energy and the other one is “Industrial Symbiosis” in scope of Environment.

As above mentioned, TCMA has taken a role as a partner starting on 1 July 2019 at “Metal Organic Frameworks for carbon dioxide Adsorption processes in power production and energy Intensive industries (MOF4AIR)” Project funded by EU Horizon 2020 Research and Innovation Programme under Grant Agreement No: 837975.

The overall objective of MOF4AIR is to demonstrate the performances of MOF-based CO<sub>2</sub> capture technologies in power plants and energy intensive industries. There are 14 partners from 8 countries in the project which is led by Mons University. The project, with a total budget of approximately 11.1 million euros, will last four years.

The Project aims to use the most suitable structure



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Capture, Industrial Symbiosis, Zero Waste Approach, Circular Economy and Digitalization



Sustainable solutions for cement and concrete



Conformity assessment and certification according in CE marking in Cement



Stack Gas Emission test



Greenhouse Gases verification



Turkish Cement Manufacturers' Association

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in different adsorption methods and implement CO<sub>2</sub> capture at the pilot scale by synthesizing metal organic framework (MOF) with high selectivity and high CO<sub>2</sub> affinity for CO<sub>2</sub> capture. The overall objective of MOF4AIR Project is to demonstrate the performances of metal organic framework (MOF) based CO<sub>2</sub> capture technologies in three demonstration sites, across Europe will prove the cost-efficiency and reliability of MOF-based carbon capture in CO<sub>2</sub> intensive sectors: power supply, refineries and waste incineration.

For details: <https://www.mof4air.eu/>

Global CO<sub>2</sub> levels are continuing to rise, limiting those weekend drives to the shops is just one of several ways to reduce our carbon footprint. TCMA's role in this project is make all the communication and dissemination activities of the MOF4AIR project, as well as the exploitation. TCMA aims to study the solution proposed in the project in the whole industrial system of carbon capture. TCMA has another role on examine social issues related to capture, transport and storage of CO<sub>2</sub>, establish the replicability and transferability of the developed solutions through an implementation plan and the involvement of an Industrial Cluster Board.

The MOF4AIR project was kicked-off at University of Mons on July 29th and 30th 2019. It was the occasion for all partners to finally meet after working remotely from each other. The 2nd consortium meeting of MOF4AIR Project was held on 14-15th January 2020 in Oslo. The partners reviewed the coming 6 months of project in order to launch activities.

Besides, TCMA R&D Institute played an active role in Fostering Industrial Symbiosis for a Sustainable Resource Intensive Industry Across the Extended Construction Value Chain (FISSAC) Project that is other funded EU Horizon 2020 programme project under Grant Agreement No: 642154.

There are 26 partners in the project consortium which is led by ACCIONA. The project, with a total budget of approximately 11 million euros, will last 4.5 years and began its work on September 2015.

The objective of the FISSAC project is to develop and

implement an innovative industrial symbiosis model that will enable the material to pass circular economy through the closed circuit manufacturing process by linking the technological and non-technological requirements in intensive industries with raw material usage in the construction value chain.

TCMA's role in this Project is manufacturing eco-cements with secondary raw materials from the upgraded valorization of steel, glass, aluminum and ceramic industrial waste and demonstration at real scale in Turkish case study of the application and the technical performance of the eco-cement.

Within this project, cooperation has been envisioned between Steel, Non-ferrous Metals, Minerals, Cement, Ceramics, Glass, Construction and Chemical industries for economic benefits and minimization of environmental impacts. Through this cooperation, industrial by-products and wastes will be valorized as alternative raw materials in manufacturing of construction materials such as cement and ceramics. Furthermore, via the ICT Platform that will be developed by this project, the industrial symbiosis network will be monitored. In that sense, geographic information systems, optimization tools and innovative network analysis indicators will be used. Project outcomes will yield to a waste utilization methodology to minimize the industrial environmental impacts over the life cycle and a map-based system that would indicate sources for the wastes. It is aimed to participate in a new perspective on industrial symbiosis projects carried out in Turkey and improve access of industrial representatives to waste valorization techniques and case studies.

FISSAC will demonstrate the applicability of the model as well as the effectiveness of the innovative processes, services and products at different levels:

Manufacturing processes: with demonstration of closed loop recycling processes to transform waste into valuable secondary raw materials, and manufacturing processes of the novel products at industrial scale - Product validation: with demonstration of the eco-design of eco-innovative construction products (new Eco-Cement and Green Concrete, innovative ceramic tiles and Rubber Wood Plastic Composites) in pre-

industrial processes under a life cycle approach, and demonstration at real scale in different case studies of the application and the technical performance of the products - FISSAC model, with the demonstration of the software platform and replicability assessment of the model through living lab concept.

Project official website [fissacproject.eu](http://fissacproject.eu) contains detailed information about the project.

Since different types of cement which increases its durability and sustainability it lasts longer. Therefore, architects and contractors are increasing aware of the availability of more sustainable alternative to Portland cement. Consequently, TCMA R&D Institute took place as a partner in another Project called “Investigation of Availability of Colemanite by-products on Boron Cement Production” which was officially started on April 2019. The project is coordinated by Eti Mining Operations General Directorate.

The overall objective of the project is production of low carbon Boron modified active belite cement (BAB) with 4 different Colemanite by-products.

Other Objectives

- Produce long term high strength cements.
- Decrease fuel energy by producing boron cement

clinker with low temperature in energy intensive cement industry.

- Decrease CO<sub>2</sub> emissions by using of low lime sources without any extra investment.
- Increase of usage of boron waste and/or low grade boron ores.

As a result, since the Turkish Cement Sector ranks 6<sup>th</sup> in cement production in the world and 1<sup>st</sup> in Europe, TCMA R&D Institute is eager to continue making research on cement and is ready to collaborate on analysis services for cement & concrete, hydraulic binders and cementitious materials and also any R&D projects on Carbon Capture Utilization and Storage, alternative raw materials and fuels, etc. with any organizations to create more sustainable environment.

We are ready to provide a “World of Solutions for Construction Materials”. We secure better future for you, especially concerning sustainability.

"The more we capture CO<sub>2</sub>, the greener future we embrace!"



\*The 2<sup>nd</sup> consortium meeting of MOF4AIR Project was held on 14-15<sup>th</sup> January 2020

## CHARACTERIZATION OF ALTERNATIVE FUEL PARTICLES AND ASSOCIATED FEEDING CONCEPTS FOR COARSER MATERIAL STREAMS

By: Prof. Dr. Dominik Aufderheide<sup>1</sup> and Dr.-Ing. Luigi Di Matteo<sup>2</sup>

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### Abstract

The combustion of alternative fuels within co-processing schemes is an established framework for increasing the sustainability of cement manufacturing all around the globe. Since the introduction of non-conventional fuels derived from waste streams as a substitution for classical fossil fuels, it was a long-lasting goal to reach a substitution rate of nearly 100% in order to guarantee long-term economic and technological competitiveness in a globalised market. However, even if this goal is almost reached in some parts of Europe, there is still a big potential on a worldwide scale. Furthermore, especially the actual developments in new calciner technologies lead to a trend to operate with much coarser and unprocessed fuels, if compared with classical fuels for the main burner. Therefore well-established strategies for AF handling needs to be adapted. This article provides some insights about proper project planning and corresponding strategic directions for AF projects with coarse fuels and introduces a systematic concept for the selection of adequate machinery.

### 1. Introduction

Today the daily work within the cement industry, both in headquarters and plant offices, is mainly determined by economic drivers, such as needs for increasing the production efficiency and capacity by a parallel reduction of costs for maintenance personnel and shorter return-on-investment (ROI) periods. These trends are the logical consequences of the actual act of global consolidation and market shake-outs within the whole industry, but especially in Europe after the financial crisis and the subsequent recession all over the south of Europe.

In this context the optimisation of energy resources and raw material supply are important factors, which are already considered by most plants. Thus the increased substitution of conventional fossil fuels by alternative energy resources is an ongoing process during the last decades and the utilisation of energy-from-waste concepts will speed up even more on a worldwide scale during the next years.

However, even if the co-processing of waste streams in the thermal combustion of the cement manufacturing chain is common sense and everyday practice in many cement plants of the world, the experiences and best-practices developed especially in Europe during the last two decades did not led to the parallel establishment of a taxonomy of corresponding machinery or guidelines for their adequate usage.

Nowadays, new calciner technologies are introduced, which allow the utilisation of much coarser solid fuels, which are less pre-processed and therefore even more interesting from an economic point of view.





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As a supplier of turn-key solutions for the co-processing of waste streams in all energy-intensive industries (Cement, Lime stone, steel, etc.), Di Matteo developed a wide range of plant concepts and corresponding machines for almost all kinds of alternative fuels and possible application fields.

This article provides a general overview of some best practice approaches and conceptual definitions regarding the design, implementation and operation of feeding, dosing and storage lines for alternative fuels (AFs). In cooperation with the South Westphalia University of Applied Sciences in Germany, the actual influence of typical properties of AF fuel streams was analysed and shall be discussed in order to provide the optimal performance of the AF feeding installation.

Table 1 provides a sound overview of the main aspects and principles for each co-processing project, where economic, socio-cultural, technological and legal aspects are differentiated.

**Table 1 - Strategic directions of co-processing projects**

Strategic directions of co-processing projects			
Economic aspects	Consider future developments of fuel prices	Consider the logistic side of AF supply	Pre-processing is essential part of AF usage
Socio-cultural aspects	Respect the waste hierarchy	Active involvement in waste management schemes	Stay in connection with all stakeholders
Technological aspects	Consider special bulk material properties of AFs	Avoid additional emissions or decreasing product quality	Choose the correct machines and adequate setups
Legal aspects	Guarantee compliance with recent laws and regulations	Collect relevant health, safety and environmental data	Develop proper training and information policies

For the implementation of AF installations, Di Matteo developed over the past years a specific concept, which is introduced in section 2. However, the correct setup of machines can only be determined if the properties of the fuel is known and defined up to a certain accuracy. Therefore, section 2 provides an overview of important characteristics of alternative fuels. As an example for the selection of machines, section 3 examines typical fuel characteristics, while section 4 introduces a a turn-key approach to coarse material reception, dosing and feeding. Finally section 5 summarizes the whole article.

**2. Seven Stage Concept (SSC) for the handling of alternative fuels**

This ongoing development of machines and concepts within the field of co-processing of waste streams was accompanied and driven by the introduction of the Seven Stage Concept (SSC) for plants for the handling, dosing and storage of alternative fuels (AFs). This concept, as depicted in Figure 1, summarises the thermal utilisation of AFs, e.g. within a cement plant, as a setup of machines from seven different stages, as described in detail in [1]:

1. *Reception*  
e.g. plants for the reception of AFs from trailers, such as docking stations or from dumper trucks etc.
2. *Preparation*

machinery for the preparation of the received material prior to the combustion process, such as screening, magnetic separation, deagglomeration, drying etc.

### 3. Storage

silo and bunker systems for the intermediate storage of AFs within the plant and their corresponding discharge systems, such as screw dischargers, moving floors, etc.

### 4. Transport

all types of conveyors for the transport of AFs in the plant, such as screw conveyors, drag chain conveyors, pipe conveyors, bucket elevators etc.

### 5. Metering

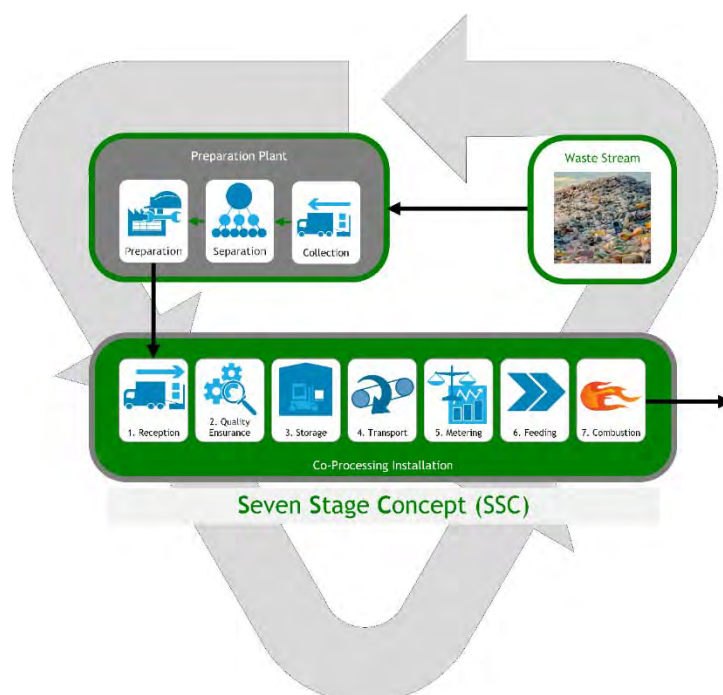
metering devices for the gravimetric dosing of AFs for a precise control of the combustion process (see also [2] for a detailed overview of metering devices for alternative fuels).

### 6. Feeding to the kiln process

e.g. the mechanical feeding of kiln inlets or calciners (e. g. by screw feeders, injectomizers etc.) or pneumatic feeding of main burners by injector rotary valves and the corresponding pneumatic transport lines.

### 7. Combustion

Successful and efficient combustion of the AF. It is essential to realize that the successful substitution of higher rates of fossil fuels by AF requires the right combination and implementation of the previous process steps [3].



**Figure 1 - Seven Stage Concept (SSC) for the systematic classification of AF handling plants**

This concept has proven its applicability in a wide range of application fields in numerous installations of Di Matteo all over the world and was already adapted by many cement producers as a cornerstone for the definition of co-processing projects. A recent implementation example can be found in [4]. In Figure 2 an example of the modular SSC from DI MATTEO is shown. Here two trailers connected to ODM-DockingSTATIONS (see Figure 2 – (a)) can be used as intermediate storages for the reception of the material, which is then transported by an ODM-TKF drag chain conveyor to a preparation and dosing tower. Here it is possible to integrate machinery for the separation of oversized particles (e.g. ODM-DiscSCREEN) or metallic parts (ODM-MAS) and furthermore the gravimetric dosing system ODM-WeightTUBE® is also integrated. Finally a rotary injector (ODM-IZS) realises the transition to a pneumatic conveying line.

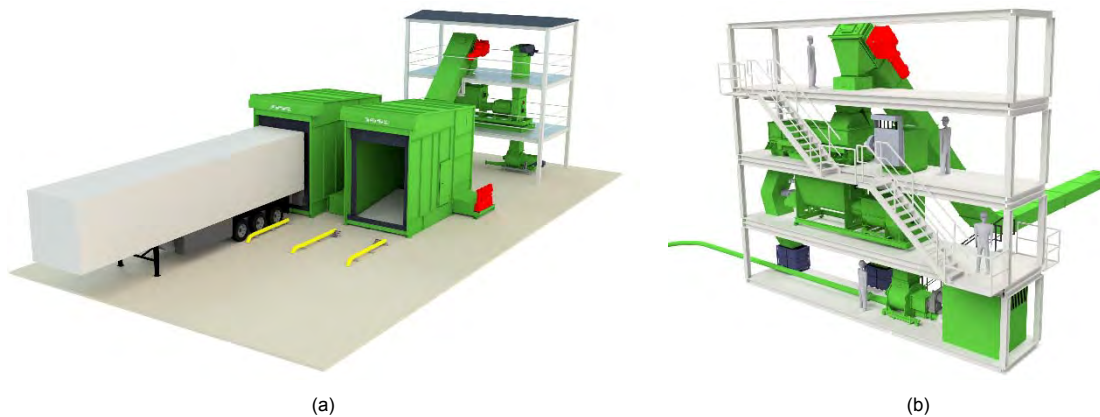


Figure 2 - ODM-MultiFUEL concept as an implementation of the DI MATTEO SSC: (a) – reception of Material by ODM-DockingSTATIONS; (b) – Preparation and dosing tower with ODM-DiscSCREEN and ODM-WeighTUBE®.

However, a proper application of the well-established framework requires a former knowledge about the fuel characteristics, as shown in the following section.

### 3. Important Fuel Characteristics

One of the major challenges in handling of alternative fuels is the high variation of fuel characteristics and the volatile nature of the associated properties, such as humidity, bulk density and particle sizes (see [5]). For this it is helpful to consider the actual processing chain for the generation of AF in preparation plants, as shown in the following Figure, where a complex series of different equipment-driven preparation stages generates the actual AF (e.g. Refuse Derived Fuels – RDF) from the input waste stream (e.g. from Municipal Solid Waste – MSW).

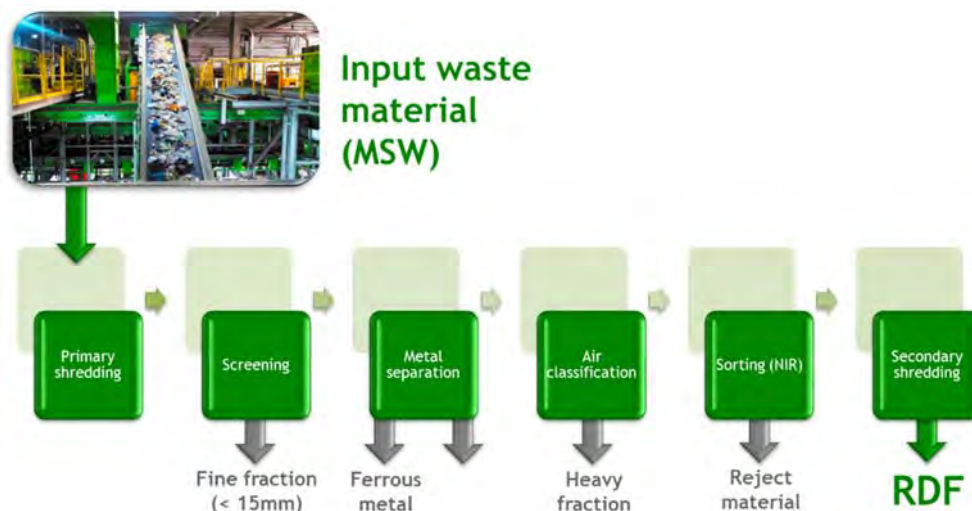


Figure 3 - Typical processing chain for the preparation of alternative Fuels

During recent years, there were different methodologies developed on how streams of AF can be classified and their actual quality can be controlled. The European Committee for Standardization (CEN) published a framework, as shown in Table 2, where five different classes for three main classification properties of alternative fuels are defined.

Table 2 – CEN classification codes for Solid Recovered Fuels (SRF) according to [6]

Classification property	Unit	Statistical measures	Classes				
			1	2	3	4	5
Net calorific value (NCV)	$MJ \cdot kg^{-1} (ar)$	Mean	$\geq 25$	$\geq 20$	$\geq 15$	$\geq 10$	$\geq 3$
Chlorine (Cl)	$\% \frac{W}{W} (d)$	Mean	$\leq 0.2$	$\leq 0.6$	$\leq 1.0$	$\leq 1.5$	$\leq 3.0$
Mercury (Hg)	$MgMJ^{-1} (ar)$	Median	$\leq 0.02$	$\leq 0.03$	$\leq 0.08$	$\leq 0.15$	$\leq 0.5$
		80% percentile	$\leq 0.04$	$\leq 0.06$	$\leq 0.16$	$\leq 0.30$	$\leq 1.0$

Typically, all the above-mentioned classification properties are measured from samples taken from the material stream during the reception of the material within the cement plant. However, such an approach provides one major drawback, since the actual results are only available after the actual material was already burned in the calciner and/or main burner and therefore there is no direct feedback between the actual material characteristic and the process control possible. The South Westphalia University of Applied Sciences in Germany works actually towards a possibility of providing inline measurements of the main characteristics of alternative fuels streams, which would provide a closed-loop approach for AF feeding in the future.

In Figure 4 an overview of typical fuels provides an idea of how different the appearance of different fuels can be, even if all of those examples are referred to as alternative fuels.



Figure 4 - Different types of fuels: (a) – Typical fine fuel (RDF) for main burner; (b) – Coarse fuel (RDF) for calciner feeding; (c) – Example for agglomerated fuel (here: carpet fluff); (d) – Coarse tire chips

Furthermore, the actual feeding point within the calcination process defines the exact requirements of the used solid fuels. Here it is possible to differentiate mainly (i). the usage of AF within the main burner and/or in satellite burners and (ii). the feeding within the calciner. While the first option requires a pneumatic feed into the

combustion process, the latter one is often realised with mechanical transport, while pneumatic transport is also possible. However, a major difference is the retention time of the fuel particles within the burning process, where the particles need to burn out completely within the burner flame in a very short time, the retention time of fuel particles in modern combustion devices of the pre-heater calciner is much longer. In combination with a modern design approach of the actual combustion devices, it is possible to burn quite coarse fuels with particle sizes up to 250mm (2D or even 3D).

In Figure 5 the typical preparation scheme for alternative fuels associated to the requirements of the burning process and infeed point is shown exemplary based on [7]. Here also some typical particle sizes are indicated.



Figure 5 - Fuel preparation and processing and associated thermal processes

#### 4. Reception, Intermediate Storage and Direct Feed of Coarse Fuels

According to the Seven Stage Concept (SSC), two major elements for an AF handling solution are the reception of the material and the associated storage. For coarse materials it is necessary to follow an approach, where the typical difficulties of such fuels (lumpy character, potential inclusion of long strips and fibres, possible 3D pieces) are considered and the machines are selected accordingly.

Di Matteo developed on their well-established ODM-MultiFUEL concept a turn-key concept for the reception and direct feeding of coarse fuels. The arrangement consists of the robust ODM-GFK surface feeder as a direct reception point for the material from dumping trucks and/or front loaders.

Furthermore it is also possible to have an intermediate storage in form of a modular ODM-MovingFLOOR, which could be also fed e.g. by front loaders or similar machinery. Figure 6 shows the actual arrangement of the turn-key solution. The outlet of the ODM-MovingFLOOR and/or the surface feeder is also equipped with homogenisation drums in order to provide a volumetric pre-dosing. The gravimetric dosing is possible by integration of an ODM-GraviSCALE belt weigh feeder. The whole arrangement comes as a complete plug & feed solution, with all electrical cabinets and cabling based on plugs.

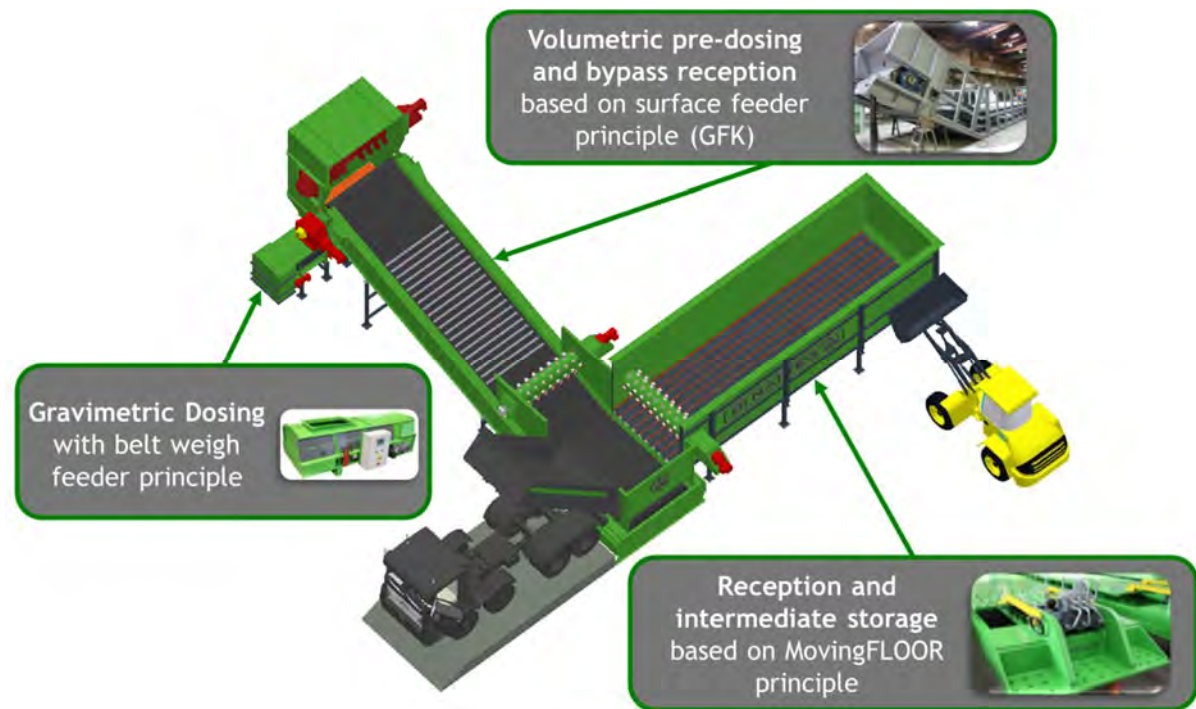


Figure 6 - Turn-key solution for coarse fuel reception, intermediate storage and dosing

From behind this arrangement the fuel can be directly fed to the main transport device, which transports the material to the calciner infeed point. The arrangement is ready to take all kind of possible fuels from coarse residue derived fuels (RDF), over tire chips, to coarse biomass (see also [8]).

The integral solution based on state-of-the-art components allows a fast project realisation and guarantees a long-lasting installation for a great variety of fuels and associated properties. Besides the full turn-key nature of the installation, a complete modular setup is still possible, since Di Matteo follow their well-established SSC scheme for AF feeding installations.

## 5. Conclusion

Even if the co-processing of alternative fuels is already successfully introduced within the industry for more than three decades, systematic and analytical approaches for a successful utilisation are not well established. In this context it needs to be mentioned, that typical mistakes and misconceptions can be found in almost each and every project phase, due to missing knowledge and experience with the usage of AFs. Due to the fact, that Di Matteo was one of the pioneers in terms of feeding and handling of problematic fuels, a sound basis for almost each application scenario and specific bulk material was already developed and can be adapted easily for new projects. In this context, it is always important that projects are executed with a holistic view, beginning from a clear vision about the requirements, over a clear specification of the properties of the available waste streams, to a systematic selection and implementation of adequate machineries. Due to a close cooperation with universities and research facilities alike, the actual classification of alternative fuels become more reliable and will be even more important in order to utilise also poor quality AF streams with a maximum efficiency and without causing negative influence on the combustion process.



**Figure 7 - ODM\_GFK surface feeder for the reception and transport of coarse alternative fuels**

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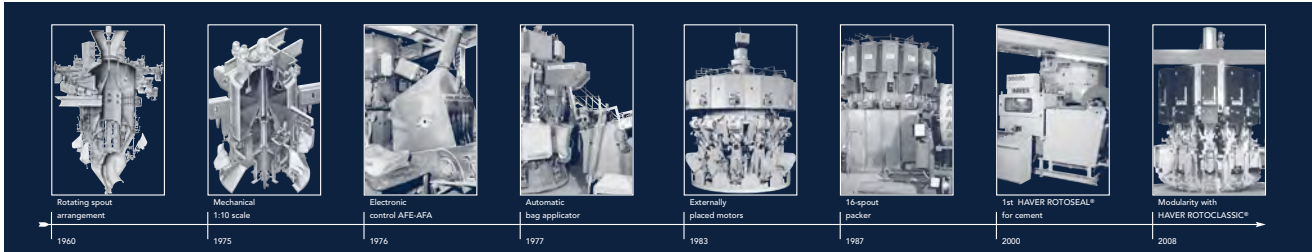
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# 60 years of the ROTO-PACKER®

## From in-line to round and how the machine made it to the moon: The ROTO-PACKER® writes a success story

By: HAVER & BOECKER, Germany



"The wheel, the light bulb, the ROTO-PACKER® - perhaps this comparison is a little limp, but the ROTO-PACKER® from HAVER & BOECKER has revolutionized an entire industry - as the original. It is comparable to the development of the bicycle, the Otto engine or manned space travel, with which it has more in common than most people would first suspect. Eight former and current employees tell what makes the ROTO-PACKER® so unique and right for the future for the cement, building materials, chemical and food and feed industries."

### Direct line to the past

The roots of the family-run business, which today employs 2,950 people, go back to the HAVER & BOECKER wire weaving mill founded in 1887. At that time in addition to woven wire cloth, it also produced wire bag closures which were used in the cement industry. In the 1920s, brothers Erich and Fritz Haver, the second generation of the company, recognized the potential of glued paper bags and so developed a row packing machine based on the American model. However, as the cement mills became more and more powerful, the demand for more powerful machines also grew.



The production in the middle of the 20<sup>th</sup> century



Pneumatics training session on the machine

Partner Dr. Reinhold Festge looks back on the events that made the ROTO-PACKER® the heart of the company. After 40 years of managing responsibility, he handed the management of the machine factory over to his sons Dr. Fabian and Florian Festge in 2014 and continues to work for the family company today as an active consultant and representative.

**Dr. Festge, how did the invention of the ROTO-PACKER® come about and what made it so successful?**

Rudolf Haver and designer Paul Schwake reacted to the request by Phoenix cement plant in nearby Beckum. The plant was in need of a more powerful system. Schwake was a visionary. He combined the already well-known idea of a round packer, which was primarily designed for jute bags, together with the unique HAVER & BOECKER filling technology - an ideal combination for filling paper bags which were just becoming established on the market. He implemented this in a machine that could also cope with the changes of the future and could be expanded. This combination and its associated operating cost advantages gave us the decisive edge. The ROTO-PACKER® benefited from the future-oriented thinking of its designer Paul Schwake and his salesman, Wolfgang Haschke, as well as from the trust of the Phoenix company, where our first ROTO-PACKER® was commissioned in April, 1960.

#### **A solid relationship**

"It was love at first sight." That's how Wolfgang Haschke describes the moment he saw the ROTO-PACKER® in operation for the first time in April 1960. "And that love grew into a solid relationship that lasted 40 years." Wolfgang Haschke was responsible for the ROTO-PACKER® from the very beginning and for almost four decades as Sales Manager of HAVER & BOECKER. He sold around 3,000 machines all over the world and within the company was given the name Mr. ROTO-PACKER®.

**Mr. Haschke, what was your most profound experience with the ROTO-PACKER®?**

There were many profound experiences. But I still remember the commissioning of the first round packer at Phoenix. 'What a wonderful machine it is', I thought when I saw the bags on the conveyor belt filled at regular intervals. Especially for the employees who loaded the bags manually onto the trucks, this regularity was a great benefit in terms of safety and occupational health. The investors of HeidelbergCement recognized this rotating filling machine's potential during a visit to our production facility in Oelde, without having seen the system in operation. They spontaneously ordered three ROTO-PACKER®s. This was a successful start

with two well-known companies, serving as strong references.



**ROTO-PACKER® using the turbine filling system and an automatic bag applicator**

**What was the biggest challenge HAVER & BOECKER mastered, thus creating the breakthrough with and for the ROTO-PACKER®?**

With the ROTO-PACKER® we had the right machine at the right moment. This was evident by the sudden boom which the Oelde plant had not been prepared for. Without hesitating, Rudolf Haver arranged for a new plant to be built. The ROTO-PACKER® enabled HAVER & BOECKER to 'rise' from a relatively unknown machine manufacturer to a globally sought-after plant manufacturer in just a very short time. The inquiries from all over the world quickly led to expansion. By expanding its subsidiaries, HAVER & BOECKER secured market access in China and Brazil, among other countries.

#### **Between craftsmanship and engineering**

"Forty years of product development also means 40 years of ups and downs", says Alois Combrink, summarizing his time with the ROTO-PACKER®. He succeeded Paul Schwake as Technical Manager in the Strategic Product Development department. "The ROTO-PACKER® had always been the measure of all things. It was our future and our success."

**Mr. Combrink, what challenges did the designers have to face back then?**

The technology of the first generation led to sleepless nights. It was unclear how the scale would react to centrifugal force, especially when the scale's beam was not in balance. The interface between the rotating system and the stationary periphery also gave us headaches. At that time, we did not have the possibilities that electronics and pneumatics offer today. At the beginning we had to solve most of the problems by using mechanical systems. The ROTO-PACKER® benefited then, as now, from many clever and creative minds.



**At home everywhere – a two ROTO-PACKER® line**

### **How have new findings in pneumatics and electronics affected the ROTO-PACKER®?**

The impacts have been enormous. While the first generation of machines was purely mechanical, except for the drive motors, we were able to use the new technology in the second generation and thus increase the level of automation. Today the ROTO-PACKER® is a detailed and balanced composition of mechanical systems, electronics and pneumatics. But all machines have one thing in common: everyone stands respectfully in front of the plant and is amazed by the precise and perfectly coordinated operation.

### **From mechanical to mechatronic**

"The change from a purely mechanical machine with an electric motor over to one that has a mechatronic, fully automated system is enormous", explains Christian Böhner. As a leading developer, he accompanied the current version, the ROTO-PACKER® RVT for packing bulk materials into traditional paper or PP valve bags - "from the initial concept, its 2016 market launch to today's continuing development."

### **Mr. Böhner, how has modern technology changed the approach to development?**

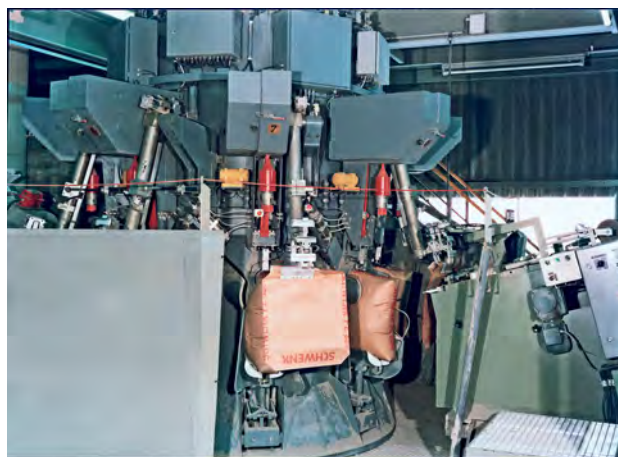
The current version of the ROTO-PACKER® is the first to be planned from the mechatronics department. That was a huge step. Before that, the electronics always followed the mechanics. The RVT is a prime example of successful cooperation between all the technical fields involved - from mechanical, electrical and mechatronic to software development. Each step was planned precisely and developed together as a team. With the RVT and the new low-maintenance ROTO-LOCK® dosing unit, we jointly set an important milestone for the ROTO-PACKER® and again brought the original another decisive step forward.

But just before the age of retirement, the ROTO-PACKER® is still as young, dynamic and ready for the future as never before. This rotating marvel of

mechanical engineering is making hearts beat faster all over the world - of companies, employees and as the core of complete packaging lines. Equipped with intelligent features such as weight control or diagnostic lighting, it fits seamlessly into the line. Moreover, in combination with other units such as the RADIMAT® automatic bag applicator, a palletizer or a truck loader, the ROTO-PACKER® particularly ensures the perfect flow of the filled product and a steady output.

### **From a mechatronic packing machine to a digital resource saver**

While Wolfgang Haschke was one of the first to see the prototype in operation, Willi Vollenkemper, today head of research and development, was one of the young developers who witnessed its last hours. "I stood in awe of the forerunner of all ROTO-PACKERS®, which was to make way for the prototype of the new generation the next day. Even at the beginning of my professional life, I had no idea the ROTO-PACKER® would be an essential part of my future career."



**The ROTO-PACKER® with the swivel arm bag applicator unit**

"A rethink is currently taking place in society. Products are being given a new value. Waste is viewed more critically and consumers are asking how to reduce their ecological footprint through sustainably manufactured products. We have to respond to this market demand," says Vincent Delatour, who has been at HAVER & BOECKER for 32 years and has headed the newly created Mechatronic Design Department for five years.

### **Mr. Vollenkemper, the ROTO-PACKER® has been a role model in the industry. Is it getting tougher to live up to this role?**

We are working hard to ensure that the ROTO-PACKER® maintains its pioneering role. Currently climate change and environmental protection are dominating development. We are already well positioned in terms of dust-free, loss-free as well as energy-saving filling. It is important to optimally



HAVER & BOECKER

The journey of an icon – different models out of 60 years the Original

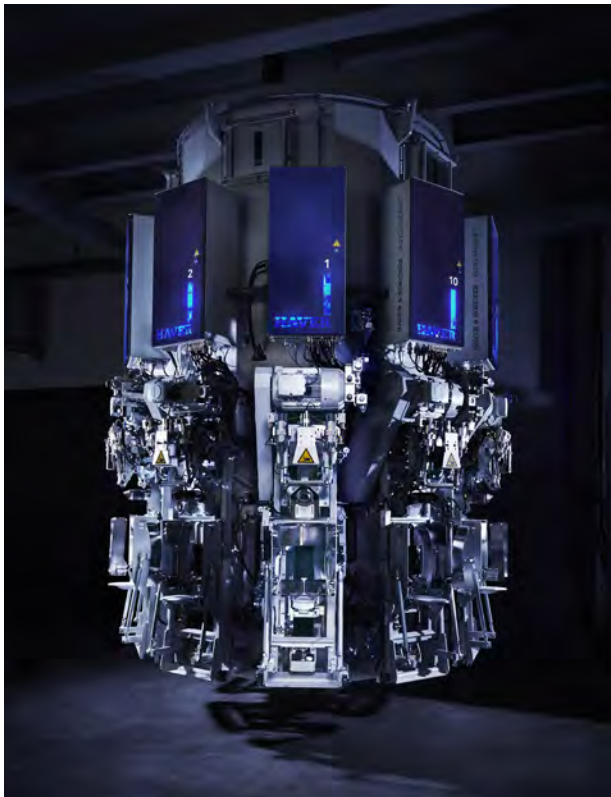
coordinate the filling technology with a future-oriented and climate-protecting packaging.

### **What does such climate-protecting packaging look like?**

A sustainable bag should protect the product well against moisture, be robust and tear-resistant, require only a small amount of packaging material, be recyclable or contain a high proportion of recycled material. Our answer to this is our ROTO-PACKER® ADAMS® technology for filling powdery bulk materials into tight PE containers. But paper valve bags can also meet at least some of these requirements if the ROTO-PACKER® is equipped with our SEAL technology and the bags are securely sealed.

### **Mr. Delatour, what challenges do developers face today?**

Coupled with the question of increasing performance, higher demands for sustainability and environmental protection go hand in hand. This means that there is growing interest in completely loss-free, clean production and energy-efficient, automated operation



**Future packaging: the newest version ROTO-PACKER® RVT SEAL Edition**

of the entire system. Explosion protection is particularly important in the chemical industry, while hygiene plays a major role in the food industry. All these requirements are taken into account in development groups. It's fun and good ideas come together through the exchange of many experts from different disciplines.

### **What projects are you tackling in the field of digitization?**

Attack is a keyword. Breaching the packing plant via a cloud system adds to the concerns about digital attacks from outside. The security and stability of these systems is very important for us.

With the "digital twin" of the system on a mobile device, the customer should be able to monitor and control the entire system in real time. In addition the focus is on "predictive maintenance", i.e. the predictive and proactive maintenance of the system according to actual demand as defined by Industry 4.0. This also contributes to the conservation of resources, as parts are not replaced after a fixed period of time, but after actual wear and tear.

### **How does the ROTO-PACKER® keep up with the trend of digitization?**

Digitization naturally plays a dominant role in the further development of the ROTO-PACKER®. An important step is the HAVER QUAT²RO system monitoring, which enables the customer to monitor the current status and performance data of his plant from anywhere in the world and to plan maintenance operations in advance and thus carry them out more effectively. The data and its evaluation enable the plant to optimize itself and react to external influences, for example. The ROTO-PACKER® thus also sets new standards in the industry for digitalization.

### **Trendsetter at all levels**

Powerful, environmentally friendly, digital - the ROTO-PACKER® is impacting entire industries. While it has had a lasting impact on the cement industry for 60 years and has met the growing demands of the chemical, food and feed industries, it is now actively accompanying the growth of the building materials industry. Burkhard Reploh, who has been with HAVER & BOECKER for over 40 years and has been responsible for the Building Materials & Minerals Division for many years, also sees the ROTO-PACKER® as the ideal system in the field of building materials.

### **Mr. Reploh, the building materials industry is growing. Why do you see the ROTO-PACKER® as a packaging system for this industry?**

Product diversification is constantly progressing. Many special products are being developed or adapted to the basic components of binders and additives. While the same product is always filled in a cement plant, companies in the building materials industry rely on a diversified and attractive product variety. Thanks to the increasingly sophisticated changeover technology for changing over to other product types, the ROTO-PACKER® now achieves significantly higher



**The group of experts – from left to right:**  
**Dr. Reinhold Festge, Partner**  
**Bernhard Pagenkemper, Chief Sales Officer**  
**Willi Vollenkemper, Manager Research & Development**  
**Alois Combrink, former Technical Manager**  
**Wolfgang Haschke, former Sales Manager**  
**Burkhard Reploh, General Manager HAVER Deutschland**  
**Vincent Delatour, Head of Mechatronic Design**  
**Christian Böhner, Head of Master Design**

operational availability with the same high quality of the products to be filled. This means that the well-known performance of our rotary packer is also given with changing products.

**Does this mean that the building materials industry has different requirements for the ROTO-PACKER® than the cement industry?**

Definitely. From a sector-specific perspective, the PE or paper packaging is more important than ever. As a result of our research into product protection, a second generation ROTO-PACKER® has been developed specifically for building materials. It can fill building materials into pure single-layer PE bags. The name of this system, which is already known worldwide in the market, is the ADAMS® system. In addition to the necessary flexibility due to the variety of types, the requirements are mainly characterized by the high abrasiveness in contrast to other products such as food. When filling different products with one system, special attention must be paid to avoiding contamination of the high quality building chemical products. The ROTO-PACKER® ADAMS® Edition is ideally suited for this and is also in great demand in the chemical industry.

**The original of yesterday remains the original of today and tomorrow**

"The ROTO-PACKER® is a true friend that not only we at HAVER & BOECKER, but also many of our customers have appreciated and loved for 60 years," says Bernhard Pagenkemper. He has been with HAVER & BOECKER for 31 years and took over as Sales Manager in 2010. "For us it is important not only to look at the successes of the past, but also to see which milestones the ROTO-PACKER® will set in the future in terms of clean packaging and loss-free product protection with full automation and maximum output."

**Mr. Pagenkemper, what changes is the consumer demand for sustainable packaging bringing for the building materials, chemicals and food industries?**

Many products that are still traditionally packed today will be packed more cleanly and more sustainably in the near future. I am thinking, for example, of entire industries changing the way they pack: the Brazilian sugar industry, for example. With the switch from open-mouth bags to valve bags at some major sugar manufacturers, the ROTO-PACKER® has recently conquered a new market segment here too. It is proving



### Made in Germany

to be very effective in the food industry.

### How will the market change and how will the ROTO-PACKER® accompany this change?

Entire system adaptability has made the ROTO-PACKER® great and will continue to be an important feature in the future. Market demands are becoming more short-lived, and our customers will have to rely increasingly on flexibility. The ROTO-PACKER® will be at their side - reliably, faithfully and with high performance. As the original, it represents the most flexible machine on the market. Due to its design, it can be adapted and converted to suit the most diverse requirements such as low production halls with no basements or to changing product characteristics, depending on the situation. This individualization supports companies in the cement, building materials, chemical and food industries to perfectly package and present their own products at all times. And in doing so, they remain in line with the wishes of their own sales markets.

### Dr. Festge, what makes the ROTO-PACKER® ready for the future?

The needs of our customers have changed dramatically - and with them our entire sales market. In countries that are developing and investing in infrastructure, the focus is on improving performance. Once this step has been taken, new demands such as environmental protection and digitalization will follow. The ROTO-PACKER®

has always been able to keep pace with these changes and will therefore be a good companion for many years to come. The adaptability and expandability of the system is unique. We respond to market requirements on short notice and lead the way with ideas for the future.

### HAYER & BOECKER reaching for the stars

In 1969, the first HAYER & BOECKER woven wire filters landed on the moon with Apollo 11. HAYER & BOECKER continues to bring its revolutionary technical development and the drive for research of this generation with it today. The impressive 60-year history of the ROTO-PACKER® shows how important the vision and driving force of individual people and the good cooperation of clever minds can be for the development of entire industries, and thus our society. And it shows how an idea becomes the guiding star of several generations of talented engineers worldwide.

### Information box:

#### The development of the ROTO-PACKER® in 7 steps

Seven major steps have repeatedly expanded the ROTO-PACKER® and brought new advantages to the cement, building material, chemical, food and feed customers:

1. The first ROTO-PACKER® convinces with new filling technology and expandability. It fills more bags than comparable systems, and this with the newly developed paper bags.
2. Weight accuracy through correction weighers.
3. Automatic bag application using a swivel arm increases performance, cleanliness & employee safety.
4. Doubling of speed.
5. Building height reduction: More compactness allows use in the markets of building materials, chemicals and feed and food stuffs.
6. Cleanliness and environmental protection through the patented ROTO-LOCK® dosing unit, the SEAL technology for welding valve bags shut and through the ADAMS® technology for filling PE packages.
7. Digitalization: The ROTO-PACKER® becomes the main control center for an entire packing facility.

The 60<sup>th</sup> Quiz” will be another part of HAYER & BOECKER’s anniversary campaign! You will find this quiz on <https://www.diemaschinenfabrik.com/en/rotopackerr/>. Please click on “The 60<sup>th</sup> Quiz”.



## *Structural assessment and repair/strengthening of aged and deteriorated concrete structures in the cement industry*

By: Guido Camata and Mark Mutter, JAMCEM Consulting, United Kingdom

### Introduction

As existing concrete structures deteriorate due to aging or are required to meet the changing demands, repair, protection and strengthening is inevitable.

There are a number of reasons for structural deterioration of aged concrete

structures as shown in figure 1 and understanding the underlying causes of concrete deficiencies is essential to design an appropriate repair/strengthen solution.

The subject is extremely complex, and it is essential to distinguish cause by symptoms since many of the symptoms can be generated by more than one cause. For example, cracking is a symptom of distress that may have a variety of causes such as corrosion, differential

settlement, loading etc. Selection of the optimal repair/strengthen technique depends on understanding the causes prior to the design of a proper repair system. The first step for a proper intervention is the evaluation of the structural condition. This investigation includes visual examination, a review of available design and construction documents, review of records of any previous repair and maintenance work, structural analysis in the actual condition and an experimental campaign to define the onsite material properties and check the structural details. The structural evaluation is necessary to relate manifestations of deterioration to causes and design the optimal intervention for short- and long-term structural performance. This article briefly illustrates two projects developed by JAMCEM to repair and strengthen two cyclone towers.

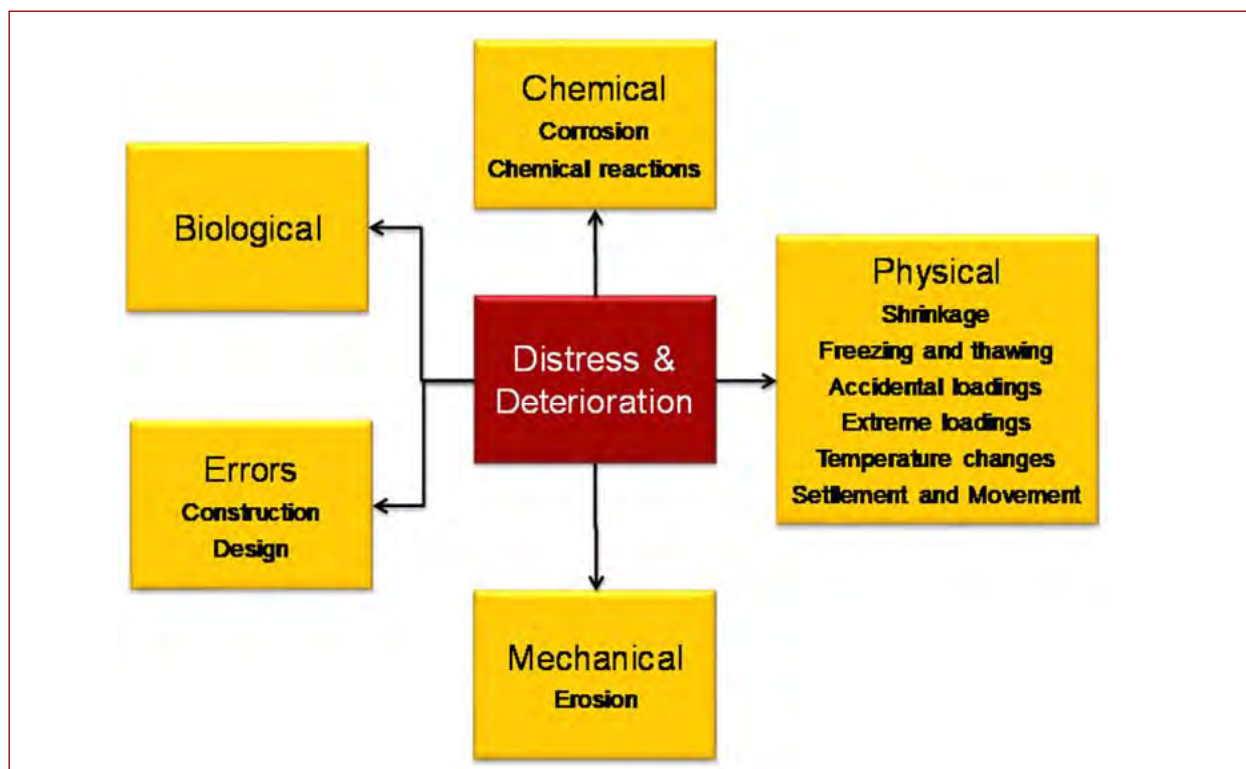


Figure 1: Causes of concrete distress and deterioration



**Figure 2: View of the cyclone tower**

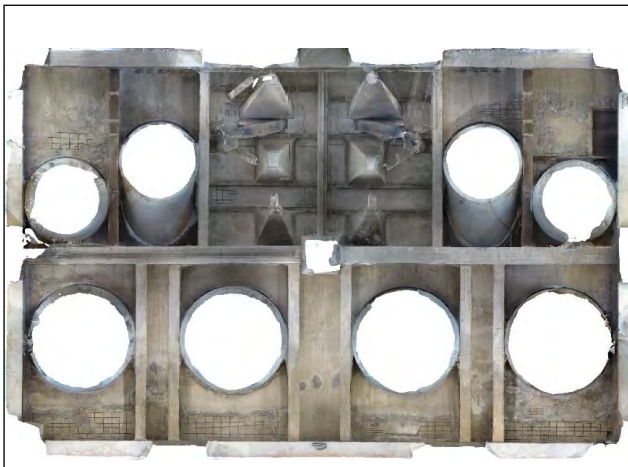
**towers**

The first project, developed in 2018, included the structural evaluation and the design of the repair, from the structural survey to the detailed design.

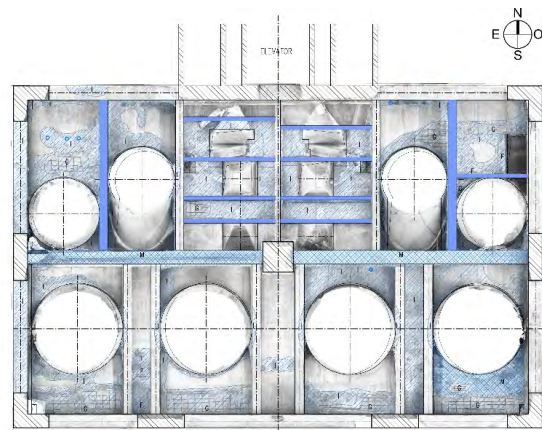
The evaluation of the deteriorated condition included a detailed geometrical survey of the damaged area and a comprehensive testing campaign. Surveying such a large structure is complex because of the presence of equipment and ducts and therefore it was decided to use high-tech instruments for unmanned aerial vehicle (UAV)/drone structural geometrical, condition survey and health monitoring.

The drone survey reduce risk, cost for scaffoldings and cranes and guarantees an accurate survey of the geometry and structural damage. In this work, the use of the drone was essential to accurately define the state and extent of the structural damage and to design precisely the optimal intervention.

Following the survey, an extensive testing structural campaign was carried out. The campaign consisted in the verification of the structural details shown in the construction documents and the determination of the material properties with destructive and non-destructive testing. Based on the observation of the structural damage, the campaign, in addition to the

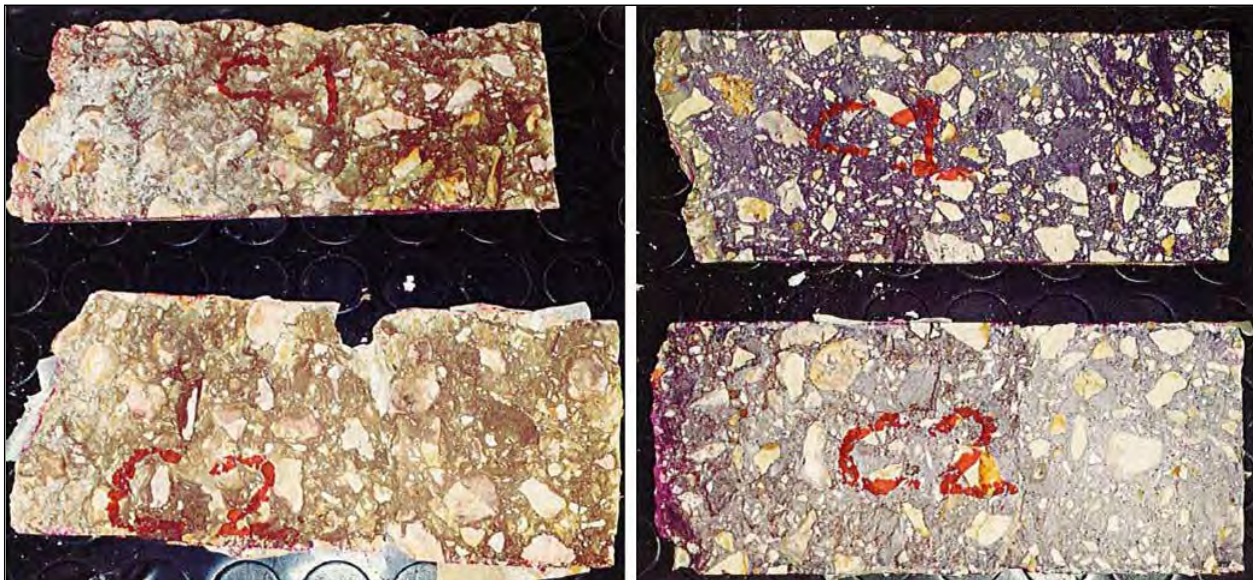


**Figure 3: Orthophotograph of 9th floor**



**Figure 4: Damage restitution orthophotography of the 9th floor**

**Evaluation, repair and strengthening of cyclone**



**Figure 5: Chlorides (left) and sulfates (right) test results**

material strength, included tests to verify the structural durability such as carbonation and tests to evaluate the chloride and sulfates content.

The structural evaluation highlighted extensive damage on the structural floors (which reduced their structural capacity), cracks on some of the peripheral beams and on the beams near the equipment because of the high temperatures. Material strengths were lower than those prescribed by the design and the durability was compromised because of an insufficient concrete cover and chemical aggression.

Based on the information collected during the evaluation, the structural design was optimized to repair the damaged structures and guarantee the structural safety and durability. The detailed design considered peculiar aspects of these type of structures such as high temperature (up to 115 °C), presence of chemical products and the necessity of executing the work in a short time, during the plant planned shutdown. In the detailed design, all these aspects were considered, and the intervention and materials were selected carefully in function of the different situations to optimize cost and speed of construction.

The second project consists of a structural strengthening of a reinforced concrete cyclone tower due to changes in equipment variation when the plant was upgraded.

The shear walls and some peripheral beams were strengthened. To optimize cost and plant downtime, it was decided to strengthen the beams with carbon fiber laminates and epoxy resin; the intervention was quite complex because of the concrete surface temperatures, which was about 75 °C. Most of the epoxy adhesives available on the market have T<sub>g</sub> (glass transition

temperature) that range between 50 and 65 °C and the guidelines available do not provide indications of how bond degrades as a function of temperature. To evaluate the bond behaviour at such high temperatures, several bond tests at temperatures ranging from 40 to 120° C were performed using four types of adhesives, which have a T<sub>g</sub> higher than 85 °C, and loading specimens under a tensile force until complete failure of the bond system. The scope of the tests was to study both the short term and long-term performance of the strengthening system subjected to several temperature cycles. The tests were analyzed by using a finite element (FE) model based on fracture mechanics which provided important insight for analyzing the experimental data. The tests and the numerical analyses showed that the performance of the CFRP bonded reinforcement do not degrade up to the glass transition temperature of the adhesive and provided the necessary information to select a strengthening system capable of resisting a temperature of up to 85 °C, necessary for the FRP strengthening of the RC beams.

Several data points were collected on site and tested to statistically determine the characteristic strength of the existing steel reinforcement and concrete. Carbonation depth and chloride presence was also tested to evaluate the concrete condition. The seismic retrofitting included both beam CFRP strengthening and shear wall strengthening, made of steel plates and bars.

The CFRP plate anchorage was provided by using special steel anchors at the plate ends. The CFRP plates were post-cured for one hour at a constant temperature of 85 °C to guarantee a T<sub>g</sub> of 85 °C. This task was the most delicate of the entire project and it was carried out by passing an electric current through the carbon plates.

## Conclusions

Figure 6: View of repaired cyclone tower

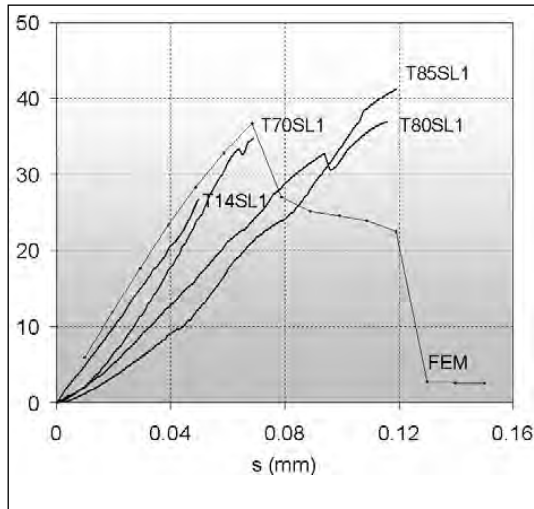


Figure 7: Load-displacement test curves



Figure 8: Beam and anchorage plate during strengthening

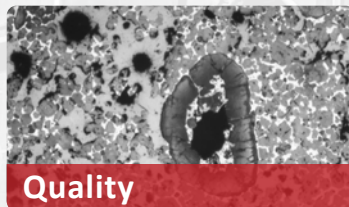
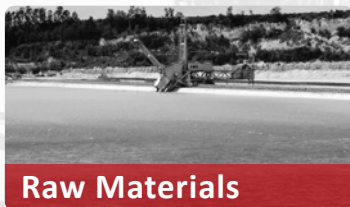
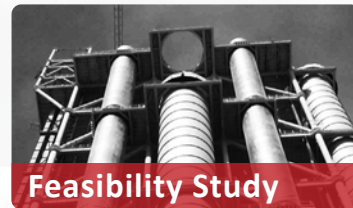
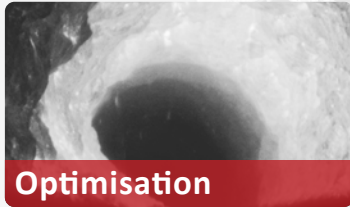
The evaluation, repair and strengthening of cement plants and in particular cyclone towers is a complex task due to high temperatures, chemical aggression and construction time constraints. The aim is to limit the plant downtime and at the same time to guarantee the structural safety and durability.

This article illustrates two projects in which the use of drones and advanced technologies were used to reduce the intervention cost and plant downtime ensuring at the same time the safety and the maximum quality.

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## ***Lindner's Polaris 1800 – The Island Solution***

***Guernsey – a popular holiday destination in the middle of the English Channel that somehow belongs to but is simultaneously separate from the United Kingdom and once inspired Victor Hugo. To preserve this idyll, the Bailiwick's waste management relies on the production of solid recovered fuels (SRF) and technology by Lindner.***

Limited space, fewer tonnes, but still maximum productivity: as special requirements need smart solutions, Lindner's Polaris 1800 shredder has been in operation at the company Island Waste, that is part of the Guernsey Recycling Group, since early 2019. Now that a year has passed, Matthew Cox, Guernsey Recycling Group's Operations Director, takes stock: 'The logistics of getting the shredder on site alone were quite an adventure. Here on Guernsey, the availability of suitable hoisting equipment is relatively limited. Consequently, we had to build the facility around the shredder and clear a whole row of bushes to get from the ferry to the construction site by lorry. But the effort was well worth it. Lindner's Polaris 1800 currently transforms about 8 metric tons of municipal waste per hour into alternative fuel. However, the shredder still has significant power reserves for possible future expansion. We can highly recommend this solution from Lindner and its regional service partner Machtech Services.'



**Guernsey Recycling Group's Operations Director Matthew Cox**

The possible applications for Lindner shredders – like that at Island Waste – are endless, and not just on islands. Producing SRF in a single step is also perfect for areas with less waste, as Marco Egger, Area Sales Manager at Lindner Recyclingtech, knows: 'With our smallest Polaris shredder we serve a very specific market. The biggest advantage, apart from the lower investment costs, is that only a magnetic separator is required in addition to the shredder to transform it into a complete system solution.' That means that even in sparsely populated or



exposed areas where the construction of a large processing facility is not feasible, more than 15 metric tons of solid recovered fuels can be produced per hour. ‘With this project at Island Waste on Guernsey, we have shown that we can always offer the perfect technology – even for small-scale projects. After all, it is always better to turn waste into a valuable resource than to dispose of it at a high cost or have waste contaminating the environment in landfills,’ concludes Egger.

Video “Lindner Polaris 1800 at Island Waste, Guernsey”: <https://youtu.be/EAj7WULenQQ>

Lindner, Spittal an der Drau/Austria ([www.lindner.com](http://www.lindner.com)): The Lindner family business has been offering innovative, tried-and-tested shredding solutions for decades. From planning, development, design and production to service, everything comes from a single source. At its production facilities in Spittal/Drau and Feistritz/Drau in Austria, Lindner manufactures machines and system components that are exported to almost one hundred countries. In addition to stationary and mobile shredders for waste processing, the portfolio also includes complete systems for plastics recycling, SRF and waste wood processing. The shredders can be used among other things for municipal solid waste, commercial and industrial waste, waste wood, plastics, packaging material, paper and light scrap.

More information:

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## ***The Variable Speed Rotor Mill can be used as a cutting mill!***

***Turn your PULVERISETTE 14 premium line with just a few simple steps into a Cutting Mill***

The **PULVERISETTE 14 premium line** is the only Variable Speed Rotor Mill on the market, which is also suitable for cutting. As a Cutting Mill it is ideal for fast, efficient pre- and fine comminution of soft to hard-tough, fibrous materials and plastics with a max. feed size < 10 mm.



**Variable Speed Rotor Mill PULVERISETTE 14 premium line as cutting mill**

### **Easy Conversion**

Simply insert a labyrinth disk, a collecting vessel, a cutting rotor with cooling fins, a sieve shells holder with fixed knives and sieve shells as well as the lid of the collecting vessel. The comminution then takes place by cutting and shearing. The instrument detects the inserted labyrinth disk and automatically operates optimised with up to 15,000 rpm and a rotor peripheral speed of up to 69 m/s for extremely high final finenesses. Cutting rotors, fixed knives and sieve shells made of different materials can be used for controlling the abrasion behaviour – for each application the perfect solution. The selected sieve shells, which are offered with trapezoidal or round perforation from 0.08 – 4 mm, determine the desired final fineness. And the use of a FRITSCH Cyclone separator will further improve throughput and cooling and is indispensable for finer mesh sizes.

**FRITSCH premium advantage: Heavy-metal- and iron-free-grinding and sample preparation according**

Only FRITSCH has it: Cutting rotors made of stainless steel TiN-coated with rotor edges and fixed knives made of pure titanium and zirconium oxide and corresponding TiN-coated sieve shells for heavy-metal- and iron-free grinding and sample preparation according to RoHS.

**FRITSCH premium advantage: Absolutely safe working**

If the instrument lid with the practical quick-clamping lock is opened unintentionally, an integrated safety lock prevents the opening of the instrument.

**FRITSCH premium advantage: Even less wear**  
The fixation against twisting of the sieve shells holder and collecting vessels ensure less wear and even quieter, vibration-free operation.

**FRITSCH premium advantage: Easy cleaning**

In contrast to conventional Cutting Mills, the entire grinding chamber of the PULVERISETTE 14 premium line – not only the cutting rotor and sieve insert, but also the collecting vessel with lid and fixed knives – can be removed and cleaned in the dishwasher. And for sterile comminution, all grinding parts, which come into contact with the sample and the grinding chamber itself, are autoclavable.

**Test the FRITSCH Variable Speed Rotor Mill PULVERISETTE 14 premium line as a Cutting Mill!**

Send us your most difficult sample – we will carry out an individual sample grinding for you. Compare for yourself!

**Up-dated information on the FRITSCH Variable Speed Rotor Mill as a Cutting Mill can be found here:**

**[www.fritsch-international.com/p-14pl](http://www.fritsch-international.com/p-14pl)**

**contact:**

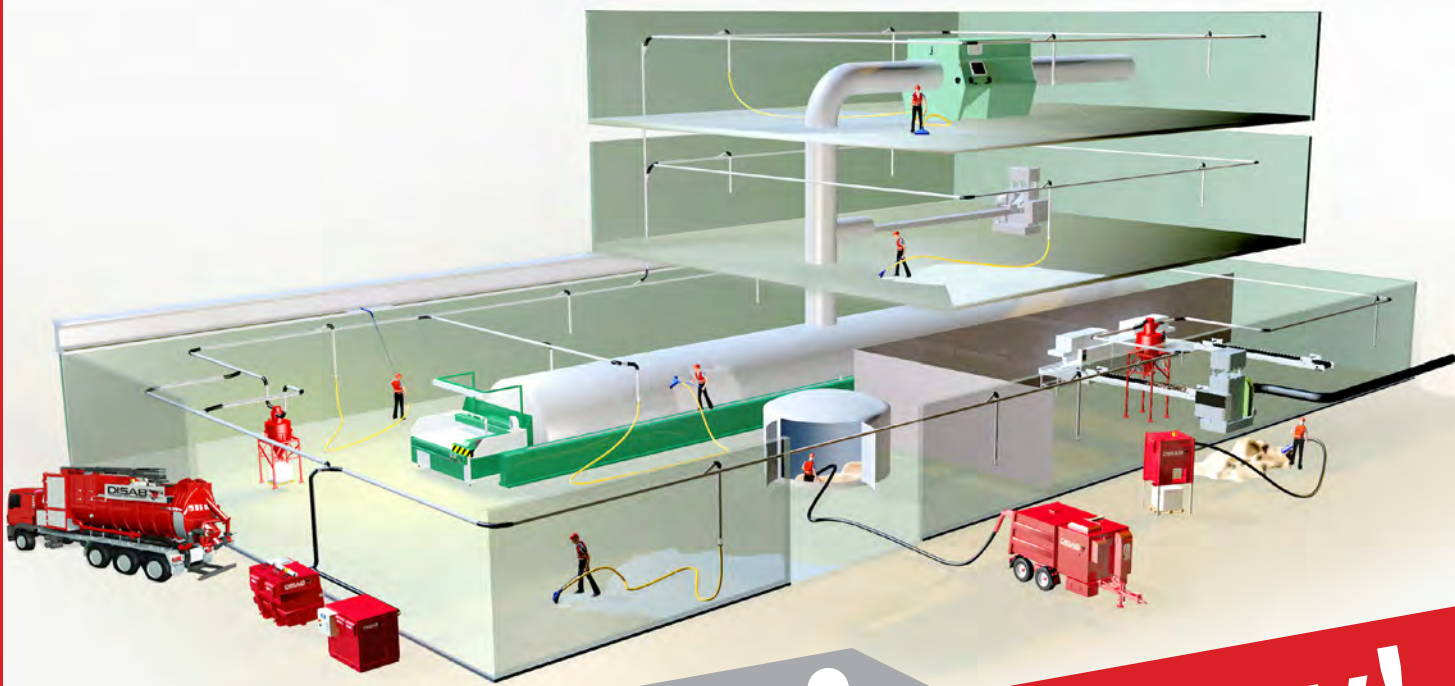
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**Contact us today and learn how to save money while keeping your cement plant clean and workers safe!**

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machines



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## ***Siemens Industrial Edge takes the benefits of the Cloud to field level***

- **Siemens Industrial Edge closes the gap between local and Cloud computing and enables high-frequency data exchange at field level**
- **Edge apps for intelligent data analysis and increased productivity**
- **Industrial Edge includes a backend, Edge devices and Edge apps in Edge Management**

With Siemens Industrial Edge, Siemens offers a digitalization solution that adds machine-level data processing to automation devices, by taking the intelligence of Edge computing and thus, sophisticated analytics securely to manufacturing level. Siemens Industrial Edge offers users the opportunity to execute a wide range of descriptive, diagnostic, predictive and prescriptive analytics applications. Cloud connectivity is used in conjunction with Edge apps from Siemens, from third-party providers or from users themselves in an integrated hardware and software ecosystem for automation components.

With Siemens Industrial Edge, Siemens offers users the opportunity to close the gap between conventional local data processing and Cloud-based data processing, depending on individual requirements. With Edge computing, large volumes of data can be processed locally almost in real time. Siemens provides users with a broad spectrum of applications for this, including data processing, data visualization via web server, data transmission to the Cloud or IT infrastructure and fast innovation cycles for app development. In addition, storage and transmission costs are reduced for users because large volumes of data are preprocessed, and only relevant data is then transmitted to a Cloud or IT infrastructure. Siemens Industrial Edge supports Cloud transmission protocols for Mindsphere, the open, cloud-based operating system from Siemens as well as Message Queuing Telemetry Transport (MQTT). This makes data

Via the Edge Management System, users can install software apps (Edge apps) from the Edge App Store of the backend system, e.g. Mindsphere, on the desired Edge devices. Edge devices are equipped with Edge Runtime software, which guarantees connectivity both for data capture from the connected automation

and for Edge Management and which features a driver toolbox for accessing device functions. Edge Runtime software also ensures a protected app environment for executing functions on Edge devices. Edge apps for Siemens Industrial Edge are provided both by Siemens and by third-party providers. It is also possible for users to develop their own Edge apps tailored to their individual requirements.

### **Siemens Industrial Edge: Industrial Edge Management, Edge devices, Edge apps**

Siemens Industrial Edge comprises the Industrial Edge Management System, Edge devices and Edge apps. The Industrial Edge Management System can be used to manage all connected Edge devices centrally and to monitor their condition. In addition, Edge apps are always distributed to Industrial Edge devices efficiently and securely in the latest version. Applications can be installed on Edge devices regardless of the machine operating state without adverse effects. Apps for Siemens Industrial Edge can be provided both by Siemens and by third-party providers. This means that users and machine builders also have the opportunity to develop their own applications, which are tailored to the individual requirements of their machines.

With the acquisition of US startup Pixeom, Siemens has obtained components for Edge Runtime for apps as well as for Device Management as part of the Siemens Industrial Edge ecosystem. The technology developed by Pixeom based on the Docker IT standard offers open interfaces e.g. for connection to the Mindsphere App Store, for the management of third-party hardware and for the creation of apps by Siemens customers. The Edge apps are offered via a marketplace in Mindsphere. The operating system of Siemens Industrial Edge is integrated in a universal security concept. It enables the stable operation of one or more apps in parallel and also ensures a protected software environment for the execution of applications on Edge devices.

### **Maximum flexibility and productivity for manufacturing plants across the entire life cycle**

Industrial Edge with Simatic offers Siemens users a platform that can meet the challenges of today and tomorrow. Automation components such as Simatic

controllers are additionally supported by Edge devices, enabling larger volumes of plant data to be processed profitably and providing vital information for the continuous improvement of productivity. At the same time, new applications such as condition monitoring or predictive maintenance are gaining ground in conventional automation technology. Furthermore, Edge computing offers a previously unattainable level of flexibility: plants can be kept up to date at all times via functional, feedback-free updates even for the plant life cycles expected in automation. Siemens users are supported in application development with frameworks and access to integrated connectivity with the world of automation. The following Edge apps are being presented at SPS 2019 for Simatic Edge:

- Simatic Notifier
- Simatic Assistant for Machines

**Stable processes and increased productivity for machine tools**

For machine tools, Industrial Edge with Sinumerik provides a machine-based platform for software apps, which captures, preprocesses and analyzes high-frequency data from the machine tool. In addition, complex tool paths can be calculated, and non-productive times or work area monitoring can be optimized. With Sinumerik Edge, Siemens enables machine tool users to improve workpiece and process quality, to increase machine availability and to further optimize machine processes. The following Edge apps have been presented for Sinumerik Edge:

For workpiece quality:

- Analyze MyWorkpiece /Capture
- Analyze MyWorkpiece /Toolpath
- Analyze MyWorkpiece /Monitor
- Analyze MyWorkpiece /Vision (AI-based)

For performance optimization:

- Optimize MyMachining /Magazine (AI-based)
- Optimize MyMachining /Trochoidal

For condition monitoring and process stability:

- Protect MyMachine /3D Twin
- Analyze MyMachine /Condition

For further information regarding Siemens at the SPS, please see [www.siemens.com/press/sps2019](http://www.siemens.com/press/sps2019) and [www.siemens.com/sps19](http://www.siemens.com/sps19)

For further information regarding Siemens Industrial Edge, please see [www.siemens.com/industrial-edge](http://www.siemens.com/industrial-edge)

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## *New ultra-compact weighing electronics for maximum precision*

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- **Seamless, user-friendly integration into Simatic automation systems**
- **Wide range of applications in pharmaceutical, food and beverage, chemical, and steel industries**

Siwarex WP351 is Siemens' newest solution for intelligent weighing automation.

Measuring 20 millimeters width by 65 millimeters height, the module is one of the smallest weighing electronics units available. The device's 1,000 Hz sampling rate and processing time combined with a digital output response time of less than one millisecond guarantee highest accuracy and repeatability. This capability represents especially in case of checking scales and high performance filling machines a big advantage, as even within very short weighing times the dosing devices are controlled in an optimal way.

As an integral part of Simatic ET 200SP, Siwarex WP351 can be seamlessly integrated into Simatic and non-Simatic automation systems, making it a clever alternative to traditional weighing terminals. The intelligent firmware gives users the ability to control weighing processes directly from the module, thereby reducing the load on the connected PLC.

Through the ethernet-connected web server, users can quickly commission and maintain the device - or gain emergency access to the scale in case of a failed or disrupted PLC. Seamless connectivity coupled with device status transparency and full access to all scale data ensures fast servicing that minimizes downtimes.

Compatible with almost all analog strain gauge load cells, Siwarex WP351 is a versatile solution for demanding weighing applications such as mixing, filling, bagging, checking, or totalizing. Due to all available certificates also in legal-for-trade operation according OIML R-51, R-61, R-76 or R-107.



Siwarex WP351 is Siemens' newest solution for intelligent weighing automation. Measuring 20 millimeters width by 65 millimeters height, the module is one of the smallest weighing electronics units available.

For further information regarding Siwarex weighing electronics, please see [www.sie.ag/2GkcRIQ](http://www.sie.ag/2GkcRIQ)

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## ***Sanindusa to restart its Tocha plant with cutting-edge SACMI Sanitaryware technology***

Complete plant covering everything from casting to robotized glazing, and featuring all the latest SACMI automation, now delivered. Plant expected to be operational by autumn, with output capacity doubling by 2020.

Casting, glazing and robotized handling: Sanindusa, a leading Portuguese high quality sanitaryware company, is now ready to resume production in style at the Tocha plant (about 50 km south of Aveiro) which was badly damaged by fire in 2017.

A long-standing partner (almost all the previously installed machines were supplied by SACMI), Sanindusa has renewed its confidence in us by purchasing the latest all-SACMI sanitaryware manufacturing, handling and glazing technology. Bringing the factory back online is a two stage process: the first already-completed stage involves installing the new machines by the end of the summer, the second will see a full plant start-up in September.

At the heart of the line lies a modern casting department. This features eight single-mould AVM machines for casting complex WCs and a series of solutions designed to revamp the two existing casting machines. The plant also has two ADM modules to manufacture tanks. These are complemented by a modernised AVB, used to produce simple WCs. All the machines are equipped with a piece pre-dryer, a SACMI solution that minimises maturing times so automatic handling of unfired products can be performed safely (car loading included).

LGV vehicles, designed and built by SACMI-Nuova Sima, will transfer pieces to the 'white' dryer. SACMI is also supplying two complete robotized glazing lines equipped with Gaiotto GA-OL and GA200 robots.

The entire plant will be managed by the SACMI H.E.R.E. (Human Expertise for Reactive Engineering) supervisor, the SACMI solution for full 4.0 production line control (from monitoring to diagnostics, from preventive maintenance to warehouse management).

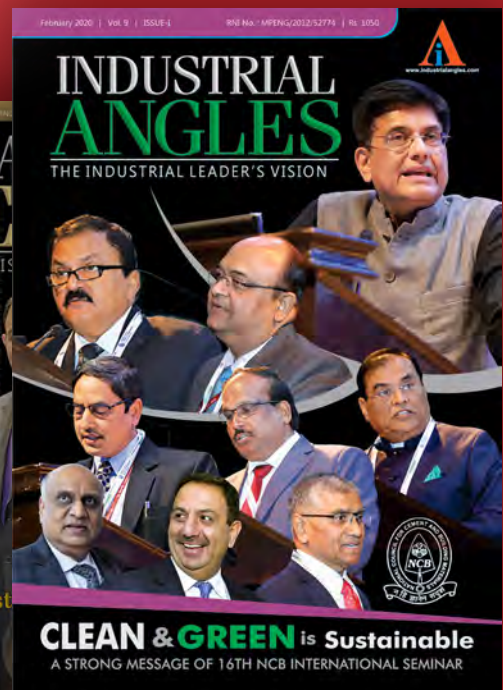
With the first phase of the investment completed, Sanindusa is now moving ahead with its plan to double output capacity at the Tocha plant by the end of 2020: again, this will be achieved by making full use of cutting-edge SACMI sanitaryware technology.

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## ➔ **FLAMINIA.**

### *Flaminia, safety and smart handling with SACMI*

New automatic handling station to convey pieces from automatic glazing to internal blowing and then to the kiln car loading area. For Flaminia, then, another decisive step towards automation 4.0.

After recently installing a complete high-tech SACMI plant, Ceramica Flaminia has now taken a further step in the direction of 4.0 automation of its production facilities in Civita Castellana (Vt). The focus of this latest investment decision is the glazing line, which is already equipped with a full complement of automation solutions and ready for the installation of laser-guided handling vehicles.

More specifically, SACMI has supplied a new handling station for the automatic transfer of pieces, deposited on cars at end of the automatic glazing line, directly to the internal blowing station. An additional robot then transfers the pieces onto a conveyor which, in turn, sends them to the firing department.

The advantage of the solution is twofold: on the one hand, it reduces manual piece handling, allowing workers to focus on more skilled tasks and enhancing plant safety. On the other, the new handling station boosts logistic efficiency, with the finished and blown pieces already deposited near the kiln car in an ergonomic position, thanks to the special configuration of the SACMI-supplied conveyor from which the pieces are picked to be sent on for firing.

Customised and developed with an eye to 4.0, the solution also mirrors the growing market demand for ever-larger sinks and WCs of high unit weight; these would be difficult to handle manually without breaching worker safety standards. For Flaminia, a pivotal player in the Civita Castellana district, this latest purchase is another step towards total plant automation and makes use of state-of-the-art SACMI technology to help build a true sanitaryware 4.0 smart factory.







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## ***CW Group***

### ***World cement equipment market to reach USD 8bn by 2024***

According to CW Research's World Cement Equipment Market and Forecast Report 2020, the market for cement manufacturing equipment and services is projected to decline to an estimated USD 8 billion by 2024. Fewer greenfield and brownfield capacity additions are expected to contribute to the negative trend.

“For Western equipment manufacturers, from a cost perspective, turnkey projects are becoming less frequent,” notes Prashant Singh, Associate Director at CW Group. “On the other hand, the market size for upgrades and spares is expanding, primarily driven by a combination of the Chinese government’s reforms to increase the efficiency of the cement sector, and rising global concerns about climate changes leading to increasingly stringent environmental standards.”

#### **Competition increases on project scarcity**

The cement plant equipment sector is and will continue to be competitive, playing out on three fronts: pricing, quality of equipment & engineering sophistication, and value-added services that include customer support and training on- and off-site.

“The current relative scarcity of projects means that a large number of suppliers are competing intensely for the same client, making the cement equipment market very much a buyer’s market. Buyers are increasingly focused on process efficiency, leading to a greater demand for automation, control and testing,” observes Carolina Pereira, Manager, Advisory & Research at CW Group.

The cement manufacturer’s geographical location determines, to a large degree, the nature of value-added services being procured. For example, a large cement manufacturer based in a remote location is likely to intensively seek a combination of off-site training and automation to increase productivity. The same could be said for manufacturers located in developed markets that are focused on reducing personnel costs.

\*\*\*\*

For more information, placing an order, or interview inquiries, please contact Mihnea Manea, Media and Market Services Executive, CW Group, by phone at +40 723 281 704, or e-mail at [mm@cwgrp.com](mailto:mm@cwgrp.com).

#### **About the Report**

The World Cement Equipment Market and Forecast Report addresses important market dynamics and provides a five-year outlook for equipment used in the production of clinker and cement. Building on a rigorous analysis of past and future cement plant capacity expansions (greenfield and brownfield expansions), the report covers all production stages, from raw material grinding to final cement dispatch. Key trends in the main production equipment segments are discussed, sized and forecasted (in USD value and capacity, where applicable), broken down into geographic segments (regions and global by equipment type).

More specifically, process-wise, the report covers equipment required in crushing (crushers), milling (raw meal mills, fuel mills, finishing mills), power (electricity generation and waste heat recovery), pyro processing (burners, pre-heaters/cyclones, kilns, coolers, alternative fuel preparation), and dispatch (weighing, bulk loading, bagging and palletizing equipment) is sized and forecast. Within the principal segments additional details are provided, including mills (vertical roller, ball and roller presses) as well as other equipment such as conveying, storage (silos, stackers/reclaimers), automation, motors, environmental & emissions (e.g., filters and scrubbers), and testing and control functions are extensively covered.

\*\*\*\*

More information about the report can be found [here](#).

#### **About CW Group**

The Greenwich (Conn.), USA headquartered CW Group is a leading advisory, research and business intelligence boutique with a global presence and a multi-industry orientation. CW Group is particularly recognized for its sector expertise in heavy-side building materials (cement), light-side building materials, traditional and renewable power & energy, petrochemicals, metals & mining, industrial minerals, industrial manufacturing, bulk cargo & shipping, among others. We have a strong functional capability, grounded in our methodical and quantitative philosophy, including due diligence, sourcing intelligence, feasibility studies and commodity forecasting. [www.cwgrp.com](http://www.cwgrp.com)

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## New Products & Media

**Global demand for sand is expected to grow only 1.2% per year through 2023 to just under 10 billion metric tons.** Growth will be well below the global average and will track demand for gravel. The shrinking availability of sand will be the primary factor restraining global demand growth. A number of countries (e.g., India, Thailand, South Korea, Saudi Arabia) are dealing with rapidly depleting sand reserves, which will limit long-term supply and will continue to increase consumer prices in regional markets.

For more information regarding **Global Construction Aggregates** visit:

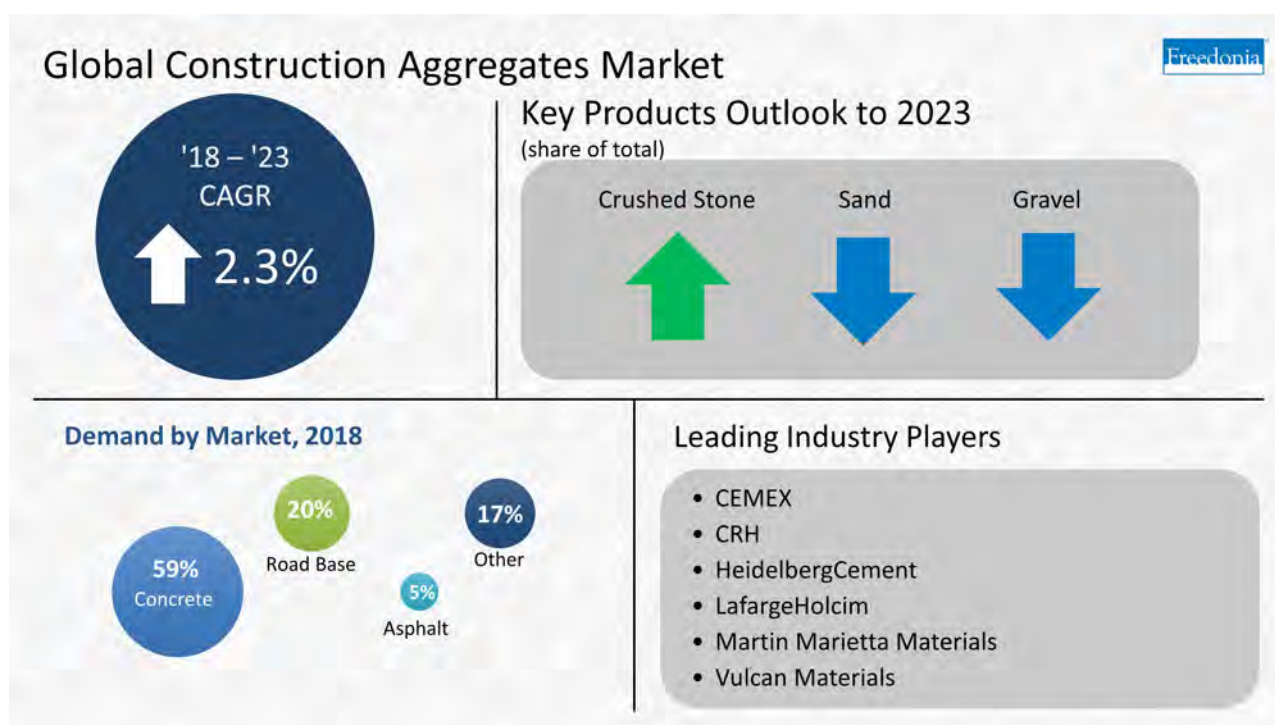
<https://www.freedoniagroup.com/industry-study/global-construction-aggregates-3742.htm>

**In developed regions with strong mining regulation, such as North America and Western Europe, demand for sand will continue to stagnate or decline through 2023.** In the wake of higher material prices, sand will continue to be replaced by crushed stone and widely available secondary and recycled aggregates.

**In developing regions of the world, especially in the Asia/Pacific and Africa/Mideast regions,** demand for sand will be supported in the near term by:

- high incidences of illegal mining, as fine aggregates will still be required in a number of applications, particularly for hydraulic concrete
- the lower availability of secondary aggregates in these regions, which limit the degree of substitution

**Despite this dichotomy, supply constraints and higher material prices for virgin sand will continue to shift consumer preference** toward crushed stone and secondary substitutes globally. The global product mix will continue shifting, and demand for sand and gravel will remain the slowest growing products.



Contact Corinne Gangloff for an interview with the analyst.

Additional Construction & Building Products studies can be viewed here:

<https://www.freedoniagroup.com/industry-category/build/construction-building-products.htm>

**About The Freedonia Group** – The Freedonia Group, a division of MarketResearch.com, is a leading international industrial research company publishing more than 100 studies annually. Since 1985 we have provided research to customers ranging in size from global conglomerates to one-person consulting firms. More than 90% of the industrial companies in the Fortune 500 use Freedonia Group research to help with their strategic planning. Each study includes product and market analyses and forecasts, in-depth discussions of important industry trends, and market share information. Studies can be purchased at [www.freedoniagroup.com](http://www.freedoniagroup.com) and are also available on [www.marketresearch.com](http://www.marketresearch.com) and [www.profound.com](http://www.profound.com).

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Venue: St. Petersburg, Russia  
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**Fax: +7(812)712-3683**  
**Email: info@jcement.ru**

### 15<sup>th</sup> Global Slag 2020

Date : 06 - 07 May 2020  
Venue: Vienna, Austria  
For more information, please contact:  
Dr. Robert McCaffrey, Global Boards Conference  
convenor  
**Tel: +44 (0) 1372 743837**  
**Fax: +44 (0) 1372 743838**  
**Email: info@propubs.com**  
**http://globalslag.com**

### 3<sup>rd</sup> Global CemProcess 2020

Date : 26 - 27 May 2020  
Venue: Munich, Germany  
For more information, please contact:  
Dr. Robert McCaffrey, Global Boards Conference  
convenor  
**Tel: +44 (0) 1372 743837**  
**Fax: +44 (0) 1372 743838**  
**Email: info@propubs.com**  
**http://cemprocess.com**

### 2<sup>nd</sup> Conference of Cement Industry & Technologies with Related Exhibition

Date : 13 - 15 July 2020  
Venue: Cham Palace – Damascus, Syria  
**Tel: 00963114476769**  
**Mobile - WhatsApp: 00963988413989**  
**Email: cementtechco@gmail.com**  
**www.cementtechco.net**

### 7<sup>th</sup> Alternative Fuels Symposium

Date : 08 - 10 September 2020  
Venue: Wyndham Hotel “Duisburger Hof”, Duisburg,  
Germany  
**Tel: +49 0 203 34 65 16 0**  
**Fax: +49 0 203 34 65 16 50**  
**Email: workshop@lechtenberg-partner.de**  
**www.lechtenberg-partner.de**

### fib ICCS20 - International Conference on Concrete Sustainability, Concrete

Date : 16 - 18 September 2020  
Venue: Prague, Czech Republic  
For more information, please visit:  
**www.fibiccs.org**

### 7<sup>th</sup> South and Central European Drymix Mortar Conference cedmmc7

Date : 17 September 2020  
Venue: Çırağan Palace Kempinski Hotel, Istanbul,  
Turkey  
**Email: info@drymix.info**  
For more information, please visit:  
**www.drymix.info**

### Alternative Fuels & Raw Materials Asia 2020

Date : 05 - 06 November 2020  
Venue: Bangkok, Thailand  
**Email: sales@gmiforum.com**

### XXII INTERNATIONAL CONSTRUCTION FORUM

**Cement. Concrete. Dry mixtures**  
Date : 10 - 12 November 2020  
Venue: Expocentre, Moscow, Russia  
**Email: info@alitinform.ru**  
**Tel.: +7 812 335 09 92**  
For more information, please visit:  
**www.infocem.info**

### 15<sup>th</sup> Annual SEADMA Conference

Date : 19 November 2020  
Venue: Hotel Aryaduta, Jakarta, Indonesia  
**Email: info@drymix.info**  
For more information, please visit:  
**www.drymix.info**

### MEDMA Drymix Mortar Showcase on Sustainable Technology

Date : 22 November 2020  
Venue: Sharjah, UAE  
**Email: info@drymix.info**  
For more information, please visit:  
**www.drymix.info**

### 1<sup>st</sup> Global Ash Conference & Exhibition 2020

Date : 02 - 03 December 2020  
Venue: Brussels, Belgium  
For more information, please contact:  
Dr. Robert McCaffrey, Global Boards Conference  
convenor  
**Tel: +44 (0) 1372 743837**  
**Fax: +44 (0) 1372 743838**  
**Email: rob@propubs.com**  
**http://cemprocess.com**

### 8<sup>th</sup> International Drymix Mortar Conference idmmc8

Date : 22 March 2021  
Venue: Nürnberg, Germany  
**Email: info@drymix.info**  
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<https://www.vdz-online.de/en>

## *CERAMIC*

**Ceramics Expo**

Date : 05 - 06 May 2020  
 Venue: Cleveland, Ohio, USA  
 For more information, please contact:  
 Danny Scott, Event Director  
[danny.scott@smartershows.com](mailto:danny.scott@smartershows.com)  
**Tel: 0044 1273 916 295**

**Raymond Pietersen, Exhibition Manager**  
[raymond.pietersen@smartershows.com](mailto:raymond.pietersen@smartershows.com)  
**Tel: 0044 1273 916 290**

**Callum Gibson, Conference Producer**

[callum.gibson@smartershows.com](mailto:callum.gibson@smartershows.com)  
**Tel: 0044 1273 916 302**

**Tecnargilla 2020**

Date : 28 September - 02 October 2020  
 Venue: Fiera di Rimini, Rimini, Italy  
**Tel: 0039 0541 744111**  
**Fax: 0039 0541 744200**  
**Email: [segreteria@tecnargilla.it](mailto:segreteria@tecnargilla.it)**

## GENERAL

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### **MosBuild 2020**

Date : 31 March - 03 April 2020  
Venue: Crocus Expo, Moscow, Russia  
For more information, please visit:  
[www.mosbuild.com](http://www.mosbuild.com)

### **SOLIDS Dortmund 2020**

Date : 01 - 02 April 2020  
Venue: Dortmund, Germany  
For more information, please visit:  
[www.easyfairs.com](http://www.easyfairs.com)

### **4<sup>th</sup> Weimar Gypsum Conference**

Date : 01 - 02 April 2020  
Venue: Weimar, Germany  
For more information, please visit:  
[www.uni-weimar.de](http://www.uni-weimar.de)

### **4<sup>th</sup> Biostimulants Europe Conference**

Date : 01 - 02 April 2020  
Venue: Granada, Spain  
**Tel: +48 616 467 022**  
**Email: rbaryah@acieu.net**

### **1<sup>st</sup> Construction Technology Forum**

Date : 14 - 15 April 2020  
Venue: Intercontinental Riyadh, KSA  
For more information, please visit:  
[www.ctf-ksa.com](http://www.ctf-ksa.com)

### **12<sup>th</sup> Annual Building & Construction Exhibition**

Date : 14 - 16 April 2020  
Venue: Bahrain Intl. Exhibitions Centre, Manama, Bahrain  
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[www.alhilalgroup.com](http://www.alhilalgroup.com)

### **10<sup>th</sup> European Algae Industry Summit**

Date : 29 - 30 April 2020  
Venue: Reykjavik, Iceland  
**Tel : +44 0203 141 0627**  
**Email : dpavlyk@acieu.net**

### **Argus Solid Fuels Asia Conference**

Date : to be announced 2020  
Venue: Mumbai, India  
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**Email: exhibiting@ifat.de / info@ifat.de**

### **Digital Utilities Europe**

Date : 06 - 07 May 2020  
Venue: Amsterdam, The Netherlands  
For more information, please contact:  
Mr. Dimitri Pavlyk  
**Tel.: +44 203 141 0627**  
**Email: dpavlyk@acieu.co.uk**  
<http://acieu.co.uk>

### **AC's 5<sup>th</sup> Biomass Trade Summit Europe 2020**

Date : 13 - 14 May 2020  
Venue: Amsterdam, The Netherlands  
**Tel: +48 616 467 022**  
**Email: rbaryah@acieu.net**

### **ACI's 5<sup>th</sup> BIOPESTICIDES Europe**

Date : 27 - 28 May 2020  
Venue: Brussels, Belgium  
**Tel: +48 616 467 022**  
**Email: rbaryah@acieu.net**

### **Digital Refining & Petrochemicals Summit 2020**

Date : 03 - 04 June 2020  
Venue: London, UK  
For more information, please contact:  
Mr. Rafael Krupa  
**Tel: 0048616467040**  
**Email: rafael@acieu.net**



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### Totally Concrete Expo and African Construction Expo

Date : 09 - 10 June 2020

Venue: Gallagher Convention Centre, Midrand, South Africa

For more information please visit:

[www.clocate.com/conference](http://www.clocate.com/conference)

### Argus Mediterranean Solid & Alternative Fuels Conference

Date : to be announced 2020

Venue: Athens, Greece

**Tel: +44 020 7780 4341**

**Email: [solidfuels@argusmedia.com](mailto:solidfuels@argusmedia.com)**

**For more information please visit:**

[www.argusmedia.com](http://www.argusmedia.com)

### Biobased Coatings Europe 2020

Date : 17 - 18 June 2020

Venue: Rotterdam, The Netherland

For more information, please contact:

Mr. Dimitri Pavlyk

**Tel : +4402031410627**

**Email: [dpavlyk@acieu.net](mailto:dpavlyk@acieu.net)**

### ACI's 7<sup>th</sup> Global Geothermal Energy Summit

Date : 17 - 18 June 2020

Venue: Florence, Italy

**Tel : +48 61 646 7022**

**Email: [rbaryah@acieu.net](mailto:rbaryah@acieu.net)**

### 23<sup>rd</sup> Arab-German Business Forum

Date : 17 - 19 June 2020

Venue: Hotel Ritz-Carlton, Berlin, Germany

**Tel.: +49 30 27 89 07 0**

**Fax: +49 30 27 89 07 49**

For more information, please visit:

[www.ghorfa.de](http://www.ghorfa.de)

### 16<sup>th</sup> International Conference on Structures Under Shock and Impact (SUSI 2020)

Date : 24 - 26 June 2020

Venue: TRYP Lisboa Oriente Hotel, Lisbon, Portugal

**Email: [wit@wessex.ac.uk](mailto:wit@wessex.ac.uk)**

**For more information, please visit:**

[www.wessex.ac.uk/conferences](http://www.wessex.ac.uk/conferences)

### Hillhead 2020

Date : 23 - 25 June 2020

Venue: Hillhead Quarry, Buxton, Derbyshire, UK

For more information, please visit:

[www.hillhead.com](http://www.hillhead.com)

### Oleofuels 2020

Date : 24 - 25 June 2020

Venue: Marseille, France

**Tel: +44 0203 141 0623**

**Email: [cwilliams@acieu.net](mailto:cwilliams@acieu.net)**

### Premier European Carbon Black Summit

Date : 24 - 25 June 2020

Venue: Frankfurt, Germany

**Tel: +48 616 467 022**

**Email: [rbaryah@acieu.net](mailto:rbaryah@acieu.net)**

### European Recycled Aluminium Summit

Date : 24 - 25 June 2020

Venue: London, UK

**Tel: +91 20 48523148**

**Email: [skanwar@acieu.net](mailto:skanwar@acieu.net)**

### The 14<sup>th</sup> Jordanian International Exhibition for Building Technology and Construction Industries

Date : 20 - 23 July 2020

Venue: Amman, Jordan

**Email: [jordanbuild@firststepmkt.org](mailto:jordanbuild@firststepmkt.org)**

For more information, please visit:

[www.jordanbuild.net](http://www.jordanbuild.net)

### Data Analytics in Construction Summit

Date : 27- 28 July 2020

Venue: Singapore

For more information, please contact:

John Karras

**Tel: +603 2775 0067**

**Email: [johnk@trueventus.com](mailto:johnk@trueventus.com)**

### 9<sup>th</sup> Annual Modular & Prefabrication Construction

Date : 27- 28 July 2020

Venue: Equarius Hotel, Resort World at Sentosa, Singapore

# Global Cement Events 2020

For details, please visit each event's web site.

Events organised in cooperation with the AUCBM.

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Brussels, Belgium  
[gyp-supply.com](http://gyp-supply.com)

The second Global GypSupply Conference and Exhibition will look at the different supply sources of gypsum worldwide, including natural gypsum, synthetic gypsum and recycled gypsum, will examine transport and shipping options, and will match up miners, syngyp producers and recyclers with buyers and users of gypsum including cement producers, wallboard and plaster manufacturers, and agricultural users. *If you use gypsum in your process, then you should attend!*



## 15th global slag

6-7 May 2020,  
Vienna, Austria  
[globalslag.com](http://globalslag.com)

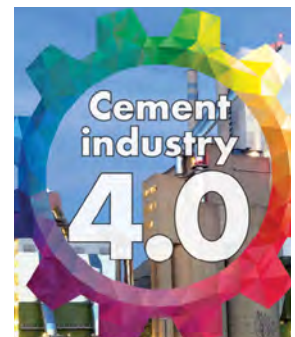
The 15th Global Slag Conference and Exhibition will take place in Vienna, convenient for all of Europe's iron-, steel- and slag-producing areas. Slag producers and users are expected to attend from throughout Europe and from the rest of the world: Slag products have the potential to be profitable for both the iron and steel industry and also for the cement, concrete and construction products industries. *If your business is in slag or needs slag, then you should attend!*



## 3rd global cemprocess

26-27 May 2020,  
Munich, Germany  
[cemprocess.com](http://cemprocess.com)

The third Global CemProcess Conference and Exhibition on Cement Industry 4.0, process optimisation, de-bottlenecking, production maximisation and troubleshooting in the cement industry will take place in Munich, Germany, in May 2020, with top-level technical information and world-class networking - including a field trip to the Burglengenfeld cement plant. *If you would like to maximise cement production while decreasing costs, then you should attend!*



## 1st global ash

2-3 December 2020,  
Brussels, Belgium  
[globalash.com](http://globalash.com)

The first Global Ash Conference and Exhibition will cover ash beneficiation, ash markets, ash shipping and trade, and ash applications and use in the cement industry (both as a pre-decarbonised raw material and filler) and in the concrete industry. The event will bring together suppliers and buyers in one central and easy-to-access location in the heart of Europe. *If you would like to maximise profit from ash, then you should attend!*



## GENERAL

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For more information, please contact:

Mr. John Karras

**Tel: +603 2775 0067**

**Email: johnk@trueventus.com**

### **2<sup>nd</sup> Annual BIM Summit**

Date : 27- 28 July 2020

Venue: Equarius Hotel, Resort World at Sentosa, Singapore

For more information, please contact:

Mr. John Karras

**Tel: +603 2775 0067**

**Email: johnk@trueventus.com**

### **Chief Data Scientist**

Date : 24 - 25 August 2020

Venue: Bangkok, Thailand

**Tel: +603 2775 0067**

**Email: marcus@strategicinformationresourceskl.com**

### **World Digital Transformation Summit**

Date : 24 - 25 August 2020

Venue: The Berkeley Hotel Pratunam, Bangkok, Thailand

For more information, please contact:

Mr. John Karras

**Tel: +603 2775 0067**

**Email: johnk@trueventus.com**

### **2<sup>nd</sup> Annual Digital Predictive Maintenance Summit**

Date : 26 - 27 August 2020

Venue: Bangkok, Thailand

For more information, please contact:

Mr. John Karras

**Tel: +603 2775 0067**

**Email: johnk@trueventus.com**

### **2<sup>nd</sup> Annual Digital Shutdown & Turnaround Conference**

Date : 26 - 27 August 2020

Venue: Bangkok, Thailand

For more information, please contact:

Mr. John Karras

**Tel: +603 2775 0067**

**Email: johnk@trueventus.com**

### **2<sup>nd</sup> Annual Sensor Tech in Engineering Summit**

Date : 26 - 27 August 2020

Venue: The Berkeley Hotel Pratunam, Bangkok, Thailand

For more information, please contact:

Mr. John Karras

**Tel: +603 2775 0067**

**Email: johnk@trueventus.com**

### **8<sup>th</sup> European Bulk Liquid Storage Summit**

Date : 30 September - 01 October 2020

Venue: Cartagena, Spain

For more information, please contact:

Cheryl Williams

**Tel: +440 203 141 0623**

**Email: cwilliams@acieu.net**

### **17<sup>th</sup> Carbon Dioxide Utilisation Summit**

Date : 21 - 02 October 2020

Venue: Brussels, Belgium

**Tel: +48 61 646 7022**

**Email: rbaryah@acieu.net**

### **Innovation and Valorisation in Civil Engineering and Construction Materials INVACO'2020**

Date : 19 - 21 November 2020

Venue: Tunisia

**Tel: (+216) 74 431 425 / 493**

**Fax: (+216) 74 431 386**

For more information, please visit:

**<http://www.ait.org.tn/evenements/detail/3-INVACO'2020>**

# PetroCem

ELEVENTH INTERNATIONAL CEMENT CONFERENCE



**26-28**  
**APRIL** 2020  
St. Petersburg  
Astoria Hotel

PetroCem 2000 – over 170 participants from 21 countries • 2002 • 2004 • 2006 • 2008 • 2010 • 2012 • 2014 • 2016 • 2018 – about 530 participants from 36 countries

**Bringing together. Cement industry professionals, managers and leading technical specialists, leading technical experts of largest Russian and international holdings, manufacturers and suppliers of materials and services, designers, analysts, bankers, researchers and consultants.**

■ **Programme, exhibition, networking.** Topical subjects under discussion: ecology, waste utilization in cement production, energy saving, product quality, etc. State of the art developments and achievements. Establishing new contacts, negotiations, promotion of business interests.

■ **Speaking the same language.** Simultaneous (Russian-English and English-Russian) translation for delegates from Russia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Tajikistan, Ukraine, Uzbekistan and about 30 more countries.

■ **Getting to know St. Petersburg.** Memorable sightseeing tours for delegates and their companions, grand and spectacular evening receptions.

■ **On record.** The previous PetroCem-2018 Conference was attended by more than 530 participants from 36 countries representing 320 companies and organisations including 85 cement manufacturers.

See you at PetroCem-2020!

Organiser:

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и его применение

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info@jcement.ru  
www.jcement.ru

www.petrocem.ru



# عالم الإسمنت ومواد البناء

تصدر عن : الاتحاد العربي للإسمنت ومواد البناء العدد 79 مارس / آذار 2020



## 25<sup>th</sup> Arab International Cement Conference and Exhibition (AICCE25)

Riyadh, Saudi Arabia

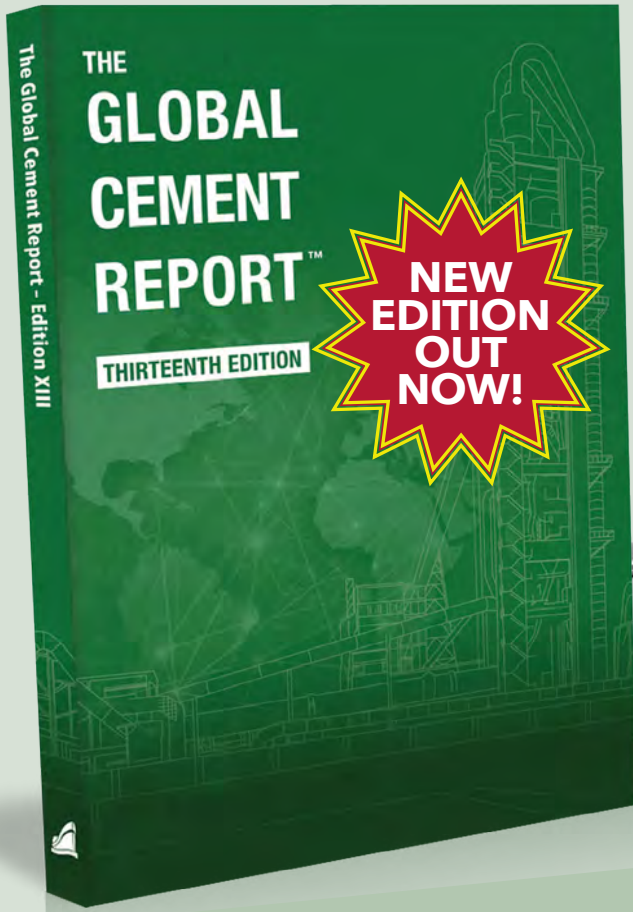
01- 03 December 2020

المؤتمر والمعرض العربي الدولي الخامس والعشرون لصناعة الإسمنت  
الرياض، المملكة العربية السعودية

Arab Union for Cement & Building Materials  
(AUCBM)  
The Event Secretariat

[www.aucbm.net](http://www.aucbm.net)  
[aicce25@aucbm.email](mailto:aicce25@aucbm.email)

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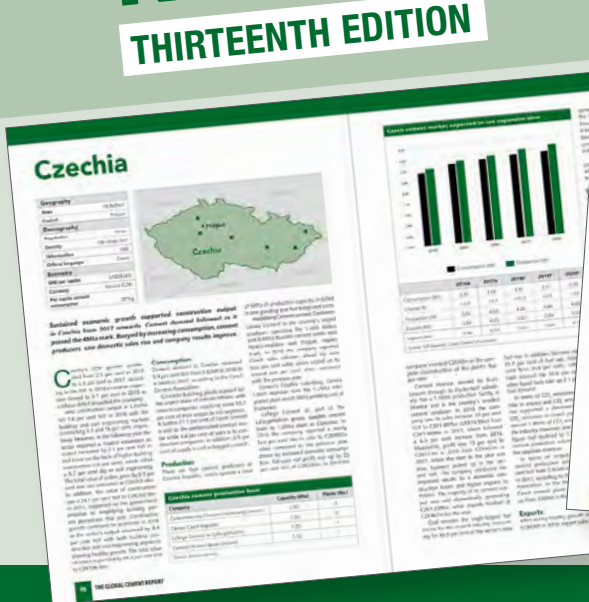
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# عالم الإسمنت ومواد البناء

مؤتمرات ومعارض

منتجات جديدة

موضوعات تقنية

أخبار عالمية

الملف العربي

رئيس التحرير الأمين العام / المهندس أحمد محمود الروسان  
مدير التحرير سها منير كنعان

## المساهمات

- ترحب هيئة تحرير المجلة بمساهمة السادة المهتمين والمتخصصين بهدف إثراء المادة التحريرية .
- لا تلتزم المجلة برد الموضوعات إلى أصحابها .
- الآراء الموجودة بالمجلة لا تعبر بالضرورة عن رأي الاتحاد أو المجلة وإنما عن الرأي الخاص بكتابها ولا يتحمل الاتحاد أية مسؤولية قانونية تجاه ذلك .

توجه كافة طلبات الإعلان باسم رئيس التحرير

الإعلان

## الإشتراكات السنوية

150 دولار أمريكي

65 دولار أمريكي

الشركات والمؤسسات

الجامعات ومراكز البحوث

Email: [aucbm@scs-net.org](mailto:aucbm@scs-net.org) / [aucbm1977@gmail.com](mailto:aucbm1977@gmail.com)

Website : [www.aucbm.net](http://www.aucbm.net)

# المكتويات

أخبار عربية  
أخبار عالمية  
منتجات جديدة

الموضوعات:

مؤتمرات ومعارض

- خطة تجارة الانبعاثات في الاتحاد الأوروبي والإسمنت: كيف وصلنا إلى هنا؟  
إعداد: *Claudia Stefanoiu/ CemBR* – المملكة المتحدة
- كيف يمكن تأسيس بناء صناعة إسمنت أكثر ملاءمة للمناخ؟  
إعداد: جمعية منتجي الإسمنت التركية – تركيا
- توصيف جزينات الوقود البديلة ومفاهيم التغذية ذات العلاقة من أجل تدفقات المواد الخشنة  
إعداد: *Dr. Prof. Dr. Dominik Aufderheide* و- *Ing. Luigi Di Matteo / DI MATTEO Group* - ألمانيا
- **ROTO-PACKER®** - ستون عاماً من العمل :  
من الخطي إلى الدائري وكيف وصلت الآلة إلى القمر:  
**ROTO-PACKER®** يكتب قصة نجاح  
إعداد: *Haver & Boecker* – ألمانيا
- التقييم الهيكلي وإصلاح / تعزيز الهياكل الخرسانية القديمة والمتآكلة في صناعة الإسمنت  
إعداد: *Mark Mutter/ Guido Camata* و - المملكة المتحدة  
*JAMCEM Consulting*
- صناعة الإسمنت في العراق  
إعداد: المهندس عمار رحيم الساعدي / جمعية مصنعي الإسمنت في العراق – العراق
- هل يؤثر لون الإسمنت على لون الخرسانة و / أو جودته  
إعداد: جمعية مصنعي الإسمنت في العراق – العراق

مؤتمرات ومعارض

## المراسلات

توجه كافة المراسلات بإسم رئيس التحرير / الاتحاد العربي للأسمنت ومواد البناء  
الجمهورية العربية السورية - دمشق - ص . ب 9015  
هاتف : 611 85 98 - 611 54 12 (11 963 +)  
فاكس : 612 17 31 (11 963 +)

Email: [aucbm@scs-net.org](mailto:aucbm@scs-net.org) / [aucbm1977@gmail.com](mailto:aucbm1977@gmail.com)

Website : [www.aucbm.net](http://www.aucbm.net)



## مجلة عالم الإسمنت ومواد البناء

### جدول موضوعات المجلة لعام 2020

المناسبات	الموضوعات	العدد
	* التعبئة والتغليف والتسليم * معدات التحميل والتفريغ من السفن * تكنولوجيا التغذية * تخزين ومناولة المواد السائبة * تخزين الوقود * أنظمة النقل والرافعات الدلوية * الصحة والسلامة المهنية * إعداد الفحم وإشعاله * مقابلة صحفية	يونيو/حزيران 2020
المؤتمر والمعرض العربي الدولي الخامس والعشرون لصناعة الإسمنت: الرياض / المملكة العربية السعودية 3-1 ديسمبر / كانون الأول 2020	* الإسمنت ذو النسبة المنخفضة من الكربون * الخرسانة * التحليل بتألق الأشعة السينية (XRF) وبحيود الأشعة السينية (XRD) * كيمياء الإسمنت * مضافات الإسمنت * انسداد الصوامع وتنظيفها * النقاط التي تؤخذ بعين الاعتبار عند تصميم الصوامع * منظومات التحريك * تكنولوجيا الوزن * تقنيات وأنظمة الاعتيان (أخذ العينات) * مقابلة صحفية	* سبتمبر/أيلول 2020
	* أنظمة التشحيم * الصيانة في مصانع الإسمنت * تقنيات الإصلاح واللحام * إدارة قطع الغيار * الطواحين العمودية * الكسارات * المبردات * تكنولوجيا الحراقات * الحراقات وفحص الحراقات * مقابلة صحفية	ديسمبر/كانون الأول 2020

● سيتم توزيع عدد سبتمبر / أيلول إلى المشاركين في المؤتمر

آخر موعد لاستلام المقالات أو النصوص الصحفية أو الإعلانات لأعداد عام 2020 هو على النحو التالي :

1. عدد يونيو / حزيران : 29 مايو / أيار 2020
2. عدد سبتمبر / أيلول (عدد خاص) : 31 أغسطس / آب 2020
3. عدد ديسمبر / كانون الأول : 4 ديسمبر / كانون أول 2020

## الإعلانات

(بالدولار الأمريكي)

الإعلان في عدد واحد	الإعلان في عددين	الإعلان في ثلاثة أعداد	الإعلان في أربعة أعداد
1,250	*	*	*
950	*	*	*
750	950	1,250	1,350
450	550	650	750
300	350	400	450
300	350	400	450

أبعاد الإعلان : A4 مع مسافة على الأطراف الأربعة  
أبعاد الإعلان على الغلاف الخارجي : ارتفاع 20 سم وعرض 14 سم  
الدقة : 300dpi  
نوع الملف : PSD أو EPS أو PDF

### [WWW.AUCBM.NET](http://WWW.AUCBM.NET) إعلان على موقع الاتحاد

- عرض 200 بيكسل وارتفاع 75 بيكسل ، بقيمة 150 دولاراً أمريكياً في الشهر الواحد
- يرجى إرسال الصور مع اللينك المطلوب ربطه بها بدقة 300 dpi (dot per inch)

## أخبار عربية

### الجمهورية التونسية

#### منتجات "إسمنت قرطاج" تحصل على علامة المطابقة "للمواصفات الأوروبية"

أعلنت شركة "إسمنت قرطاج" عن حصولها على مواصفة مطابقة منتوجاتها "للمواصفات الأوروبية (سي أو)" ، بما يتيح لها النفاذ الى هذه السوق في وقت ستشروع في تصدير 150 ألف طن من الإسمنت نحو أوروبا خلال شهر مارس / آذار 2020 .

وتعكف "إسمنت قرطاج" ، وهي شركة مصادرة عاشت صعوبات هيكلية ومالية في السنوات الأخيرة أيضاً على الارتقاء بمجال البحث والتطوير والاستجابة إلى متطلبات العملاء وتجسيم أهداف مخطط الأعمال .

وكانت هيئة السوق المالية قد منحت "إسمنت قرطاج" التأشيرة القانونية لرفع رأس مالها من نحو 172 مليون دينار إلى 395 مليون دينار عبر طرح أسهم جديدة . وتعتبر "إسمنت قرطاج" أن عملية الاكتتاب تدرج في إطار عملية هيكلية مالية وتسوية وضعية الأصول الذاتية في إطار الفصل 388 من مجلة الشركات التجارية

المصدر: [www.almasdar.tn](http://www.almasdar.tn)

### العربية السعودية

#### عمومية "إسمنت الجوف" توافق على تعديل أغراض الشركة لتشمل إنتاج جميع أنواع الإسمنت

وافقت الجمعية العامة غير العادية لشركة إسمنت الجوف على تعديل المادة رقم 3 من النظام الأساسي للشركة المتعلقة بأغراض الشركة ، لتصبح "إنتاج جميع أنواع الإسمنت" بدلاً من "إنتاج إسمنت بورتلاندي عادي ومقاوم للكبريت" ، وإدارة وتشغيل مصانع الإسمنت .

المصدر: [www.argaam.com](http://www.argaam.com)

### دولة قطر

#### أرباح قطر الوطنية للإسمنت

أفصحت شركة قطر الوطنية لصناعة الإسمنت عن بياناتها المالية للفترة المنتهية في 2019/12/31، حيث بلغ صافي الربح 172.16 مليون ريال قطري مقابل صافي الربح 347.83 مليون ريال قطري لنفس الفترة من العام الذي سبقه .

وبلغ إنتاج الشركة من الإسمنت العادي والمقاوم حوالي 202 مليون طن مقابل حوالي 2.9 مليون طن في السنة السابقة ، وبلغ إنتاج الرمل المغسول حوالي 4.8 مليون طن مقابل حوالي 7.8 مليون طن في السنة السابقة ، وبلغ إنتاج كربونات الكالسيوم حوالي 46 ألف طن مقابل حوالي 47 ألف طن في السنة السابقة. وبلغت مبيعات الشركة من الإسمنت بمختلف أنواعه حوالي 2.3 مليون طن ، مقابل حوالي 2.9 مليون طن في السنة السابقة ، كما بلغت مبيعات الرمل المغسول حوالي 5 ملايين طن مقابل حوالي 7 ملايين طن في السنة السابقة وزادت مبيعات كربونات الكالسيوم حوالي 49 ألف طن مقابل حوالي 47 ألف طن في السنة السابقة .

وفيما يتعلّق بأبرز إنجازات العام 2019 فقد تم توفير احتياجات السوق من الإسمنت بأنواعه والرمل المغسول وكربونات الكالسيوم بجودة عالية وأسعار مناسبة ما حقق دعماً مقدّراً للنهضة العمرانية في البلاد . بالإضافة إلى الاستلام النهائي لجميع أجزاء مصنع الإسمنت رقم (5) بطاقة تصميمية تزيد على 5 آلاف طن إسمنت في اليوم وتسوية جميع الأمور العالقة مع المقاول: شركة فيفز أف سي بي الفرنسية.

ترشيد الإنفاق في عمليات التشغيل المتنوعة ، للمحافظة على مدخرات الشركة والكفاءة في التشغيل على الوجه المطلوب ، وتنويع منتجات الشركة واستغلال الطاقة الإنتاجية المتاحة بدخول الإسمنت الأبيض في سلة منتجات الشركة ومبيعاتها .

المصدر: [www.raya.com](http://www.raya.com)

### ليبيا

#### إعادة فتح مصنع إسمنت الخمس مع أساليب عملية أكثر ملاءمة للبيئة

أعلنت بلدية الخمس عن إعادة فتح مصنع إسمنت خمس التابع "للشركة الأهلية للإسمنت" بعد إدخال تعديلات تقنية حديثة لمعالجة التلوث البيئي الناجم عن عملية تصنيع الإسمنت .

حيث تم تركيب مرشحات جديدة للحد من انبعاثات الغبار والغاز الناتجة عن عملية الإنتاج ، وقد أوضحت البلدية أن الشركة الأهلية للإسمنت قد اتخذت "هذه الخطوة كدليل على التزامها بحماية الأشخاص الذين يعيشون في مناطق تقع بالقرب من المصنع من مخاطر التلوث" .

المصدر: [www.libyaalmokhtar.com](http://www.libyaalmokhtar.com)



**SIMAN NEWS**

Iran Cement News Agency



[www.simankhabar.ir](http://www.simankhabar.ir)

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## صناعة الإسمنت في العراق

صناعة الإسمنت في العراق

إعداد / المهندس عمار رحيم عبدالله الساعدي

معاون مدير عام الشركة العامة للإسمنت العراقية

رئيس اللجنة الإدارية والمالية والقانونية – جمعية مصنعي الإسمنت في العراق

ammarsaedi@cpai.iq

تشكلت جمعية مصنعي السمنت في العراق عام 2015 كمنظمة غير حكومية ضمن قانون المنظمات غير الحكومية رقم 12 لسنة 2015 ضمت في عضويتها شركات الإسمنت للقطاعين العام والخاص وهي عضو في الاتحاد العربي للإسمنت ومواد البناء وتعمل الجمعية على :

- 1 - توسيع الوعي في استخدام السمنت المنتج محلياً وتطوير المنتجات الصديقة للبيئة .
- 2 - إنشاء برامج للتعاون مع الهيئات الحكومية من أجل التغلب على المعوقات التي تواجه مصنعي الإسمنت في العراق .
- 3 - إقامة وإدامة علاقات التعاون مع المنظمات العربية والدولية ذات الأهداف المشتركة .
- 4 - إصدار النشرات والمجلات التي تعنى بنشر أهداف الجمعية والأنشطة الثقافية والاقتصادية والاجتماعية من أجل رفع الوعي المجتمعي في هذا المجال .

\* ولها عدة وسائل لتحقيق هذه الأهداف منها ( الترويج للمنتج / حماية حقوق المستهلك و المنتج الوطني / إعداد دراسات الطلب المتوقع / التعاون مع الهيئات الصناعية ) .

\* وقد نظمت الجمعية خمسة مؤتمرات لمصنعي الإسمنت منذ عام 2013 ولغاية عام 2019 كانت تتضمن عرض معلومات مفصلة عن صناعة الإسمنت والمعامل الموجودة والطاقت الإنتاجية والتصميمية والمتاحة والمتحققة، وكانت تحث الحكومة على إصدار قرار حماية منتج السمنت . فعلاً تم إصدار قرار حماية منتج السمنت إلا أن ذلك لم ينفذ في الحد من انتشار السمنت المستورد الذي كان يدخل بأسعار رخيصة جداً ، وتم العمل على إصدار قرار من خلال المؤتمر الذي أقيم عام 2015 لمنع استيراد الإسمنت وفعلاً صدر القرار المرقم (409) لسنة 2015 وتم تطبيقه عام 2016 . ولحد الآن ، فإن معامل السمنت المحلية كانت ولا زالت قادرة على سد الحاجة المحلية ويوجد فائض من الإنتاج يقدر بـ 10 ملايين طن والمحافظة على أسعار البيع وعدم زيادتها .

إن صناعة الإسمنت في العراق كانت ولا تزال من أهم الصناعات التي يعتمد عليها في تنمية اقتصاد البلد وتوفير المادة الأساس لإعادة الاعمار وتطوير البنى التحتية ، وقد عانت هذه الصناعة بعد عام 2003 من الإغراق بالإسمنت المستورد بالإضافة إلى تقادم مصانع الإسمنت الحكومية . إذ أن دخول المستثمرين على صناعة الإسمنت وبناء مصانع إسمنت جديدة من قبل القطاع الخاص نهض بهذه الصناعة بشكل كبير حيث تم إنشاء تسعة معامل سمنت تعمل حالياً ، كذلك ثلاثة طواحين إسمنت بالإضافة إلى المعامل الحكومية والبالغ عددها 17 معملاً ونوجز أدناه الطاقة التصميمية لهذه المعامل ، وكما يلي :

## تقارير

معامل القطاع العام : الشركة العامة للسمنت العراقية – 17 معملاً بطاقة تصميمية 17,244,000 طن سنوياً

الطاقة التصميمية	اسم المعمل	ت
2,000,000	معمل سمنت كركوك	1
2,000,000	معمل سمنت كبيسة	2
1,000,000	معمل سمنت القائم	3
291,000	معمل سمنت الفلوجة للسمنت الابيض	4
200,000	معمل سمنت بادوش القديم	5
720,000	معمل سمنت بادوش الجديد	6
1,000,000	معمل سمنت بادوش التوسع	7
255,000	معمل سمنت حمام العليل القديم	8
382,000	معمل سمنت حمام العليل الجديد	9
2,000,000	معمل سمنت سنجار	10
156,000	معمل سمنت النجف الأشرف	11
1,781,000	معمل سمنت الكوفة	12
1,959,000	معمل سمنت المثنى	13
802,000	معمل سمنت السماوة	14
198,000	معمل سمنت بابل	15
600,000	معمل سمنت البصرة	16
1,900,000	معمل سمنت كربلاء	17
17,244,000	المجموع	

### معامل القطاع الخاص

الطاقة التصميمية طن سنوياً	اسم المعمل	ت
6,000,000	شركة ماس العراق لصناعة الإسمنت / السليمانية	1
2,100,000	(شركة لافارج لصناعة الإسمنت / معمل بازيان)	2
1,500,000	شركة الدوح للصناعات الإسمنتية / السماوة	3
2,000,000	شركة خيرات الآبار العراقية / معمل سامان / السماوة	4
2,000,000	شركة المبروكة لصناعة الإسمنت (طاحونة) / أم قصر	5
2,000,000	شركة دلتا للإسمنت / معمل سمنت دلتا / السليمانية	6
800,000	شركة ارض العمارة (طاحونة) / العمارة	7
960,000	شركة الكيطان (طاحونة) / أم قصر	8
2,000,000	معمل سمنت النجف الأشرف	9
2,000,000	معمل سمنت قرجوع	
2,000,000	معمل سمنت كاسن	10
1,750,000	معمل سمنت طاسلوحة	
25110000	المجموع	



• وبذلك تبلغ الطاقة التصميمية للمعامل كافة بحدود 43 مليون طن سنوياً ، إلا أن الطاقة الفعلية المتحققة لا يتجاوز 50 % من هذه الطاقة ، وهذا يمثل الاستهلاك الحقيقي للبلد خلال السنوات الماضية بسبب احتلال عصابات داعش الإرهابية لعدة محافظات والعمليات العسكرية منذ عام 2014 ولغاية تحرير كافة المحافظات عام 2018 . والجدول أدناه يمثل الطاقات الإنتاجية لمصانع الإسمنت من عام 2014 ولغاية 2018 .

ت	اسم الشركات	الطاقة التصميمية طن	الطاقة الإنتاجية لعام 2014 طن	الطاقة الإنتاجية لعام 2015 طن	الطاقة الإنتاجية لعام 2016 طن	الطاقة الإنتاجية لعام 2017 طن	الطاقة الإنتاجية لعام 2018 طن	الطاقة الإنتاجية لعام 2019 طن
1	الشركة العامة للإسمنت العراقية	17,244,000	3,413,613	2,357,513	3,209,480.95	4,126,000	4,105,774	3,178,096
2	شركة ماس العراق لصناعة الإسمنت	6,000,000	4,776,795	3,662,529	4,007,758	3,825,000	4,265,136.22	4,764,521
3	(شركة لافارج لصناعة الإسمنت (معمل باريان	2,100,000	4,000,000	4,220,000	4,148,808	4,300,000	2,051,195	4,245,000
4	شركة الدوح للصناعات الإسمنتية	1,500,000	487,367	993,684	1,300,000	1,324,000	1,059,675.76	996,312
5	شركة خيرات الأبار العراقية/ معمل سامان	2,000,000	-----	-----	-----	-----	957,765	1,734,000
6	شركة المبروكية لصناعة الإسمنت	2,000,000	528,659	761,757	1,530,000	1,471,000	2,052,984	1,959,334
7	شركة دلتا للإسمنت	2,000,000	47,627	1,379,785	1,600,000	1,370,000	870,754.56	1,569,937
8	شركة كلر للهندسة والانشاءات المحدودة	معمل النجف الاثرف	-----	-----	200,000	1,412,000	1,497,747	2,035,507
		معمل فرجوع	-----	-----	-----	993,000	1,931,680.08	1,762,894
9	مجموعة الفاروق القابضة	معمل كاسن	-----	-----	226,477	1,600,000	1,828,000	2,296,000
		معمل طاسلوحة	1,750,000	-----	-----	467,000	1,134,000	1913000
المجموع		40,594,000	13,254,061	13,375,268	16,222,523.95	20,888,000	21,754,711.62	26,454,601
نسبة إنتاج القطاع الحكومي من مجموع الإنتاج الكلي %		42	25.7	17.6	19.8	19.7	18.9	12
نسبة إنتاج القطاع الخاص من مجموع الإنتاج الكلي %		58	74.3	82.4	79.2	79.3	81.1	88

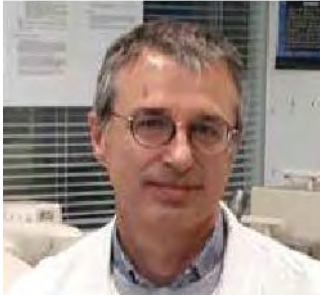
لقد واجهت صناعة الإسمنت تحديات كثيرة وستواجهها في المستقبل كذلك يمكن أن تتلخص بما يلي:

- 1 - عدم التوازن بين العرض والطلب - إن أهم ما تقوم به جمعية مصنعي الإسمنت هو تقييم التطور المستقبلي لسوق السمنت من أجل تخطيط الفعاليات ودراسة تطور سوق السمنت للسنوات العشر المقبلة حيث أنه :
  - بسبب الحرب ضد داعش والوضع الاقتصادي للبلد فإن الطلب وصل إلى حدود 18 مليون طن عام 2016 مقابل 26 مليون طن عام 2013 ، وتشير التوقعات إلى أنه بعد نهاية الحرب وبدء حملة إعادة الاعمار وانتعاش الاقتصاد فإنه يتوقع وصول الطلب إلى حدود 25 مليون طن سنوياً عام 2020 و( من 38 إلى 40 ) مليون طن سنوياً عام 2025 .
  - بفضل الاستثمارات الضخمة للقطاع الخاص لصناعة الإسمنت ، وكذلك خطة وزارة الصناعة وتوجهها في إحالة معاملها بعقود مشاركة مع القطاع الخاص وتأهيل العديد من المعامل التي كانت تحت سيطرة داعش الإرهابية والتي بدأت قسم منها بالإنتاج وتبدأ بالتسويق خلال السنوات المقبلة ، فقد زادت طاقة قطاع الإسمنت المتحققة من 14 مليون طن عام 2014 إلى 16 مليون طن عام 2016 وإلى 20 مليون طن عام 2017 و22 مليون طن عام 2018 .
  - تشير التوقعات بأن صناعة الإسمنت تسير باتجاه عدم توازن كبير في ميزان العرض والطلب ، حيث يقدر فائض القدرة الإنتاجية بحدود 10 مليون طن عام 2020 . إلا أنه في نفس الوقت يعتبر مؤشراً مهماً إيجابياً يعكس قدرة صناعة السمنت بمعاملها القائمة حالياً على سد الحاجة المحلية بشكل كامل وهناك منافسة في السوق تعكس الحفاظ على عدم ارتفاع أسعار البيع وانخفاضها بشكل دائم .
  - تعكس المؤشرات أعلاه وضعاً يدعو للقلق كثيراً وذلك يعني أن مصانع الإسمنت ستعمل بحوالي من 60 - 70 % من طاقتها الإنتاجية الإجمالية ، كما أن تزامنها مع وجود سعر منخفض في الأسواق بسبب المنافسة الشديدة ستؤدي إلى مواجهة الشركات المصنعة لمزيد من الصعوبات المالية .
- ما ورد أعلاه يعكس أن البلد يستهلك موارده البشرية والمالية في قطاع السمنت دون الحاجة لذلك ، بينما يمكن توجيه هذه الأموال والاستثمارات والموارد إلى قطاعات أخرى يحتاجها البلد أكثر ، لذلك فإن عملية التخطيط للاستثمارات تحتاج إلى تصحيح .
- 2 - لقد عانت صناعة الإسمنت في العراق لسنوات طويلة من منافسة غير عادلة والإغراق المتعمد من الدول المجاورة التي كانت تدعم صناعة الإسمنت بالوقود والطاقة ، مما انعكس على انخفاض كلف الإنتاج في تلك الدول وبالتالي انخفاض أسعار البيع ، حيث تبلغ كلفة الوقود في إيران مثلاً ( 3 دولارات ) لكل طن سمنت بينما في المعامل التي في الوسط والجنوب ( 8 دولارات ) وفي المعامل الواقعة في الإقليم ( 16 دولاراً ) لكل طن سمنت . وكذلك فيما يخص كلفة الطاقة فإنها تبلغ ( 1,5 دولار ) لكل طن في إيران مقابل ( 6 دولارات ) لكل طن في الإقليم و( 12 دولاراً ) لكل طن في وسط و جنوب العراق .
  - 3 - إن أغلب المصانع في الوسط والجنوب تعتمد كلياً بتوفير الطاقة على محطات توليد خاصة بها ولا يتم تغذية أي معمل من الشبكة الوطنية ، وهذه المحطات تحتاج إلى كلف صيانة عالية جداً . أما في الشمال فإن الشبكة الوطنية لم تعد كافية لتزويد كافة المصانع مما يتسبب بعض الأحيان في توقف هذه المصانع لفترات طويلة بسبب انقطاع التيار الكهربائي . أما فيما يخص الوقود HFO فإن أغلب المصافي المحلية ليست قادرة على سد الطلب المتزايد على HFO بسبب تزايد مصانع الإسمنت ، مما يضطر بعض المصانع إلى التوقف بين الحين والآخر بسبب نقص الوقود .
  - 4 - تكلفة الإنتاج التي تعد مصدر قلق كبير للمعامل بسبب ارتفاعها مقارنة بالدول المجاورة ، وكمثال على ذلك فإن سعر زيت الوقود HFO هو ( 80 دولاراً ) لكل طن في وسط و جنوب العراق ، في حين يكون ( 180 دولاراً ) لكل طن في إقليم كردستان مما ينعكس على اختلاف كلفة الإنتاج للطن الواحد من السمنت بمقدار ( 8 دولارات ) لكل طن .
  - 5 - إضافة إلى ذلك فإن عدم ثبات الأسعار للنفط الأسود HFO يؤثر بشكل كبير على كلف الإنتاج ، حيث زاد سعر اللتر الواحد من النفط الأسود عام 2018 من 100 دينار / لتر إلى 150 ديناراً / لتر بشكل مفاجئ ، حيث أثر على كلفة إنتاج الطن الواحد من السمنت فيه 3,5 دولار لكل طن ولا يمكن لشركات الإسمنت السيطرة على ذلك التذبذب .
  - 6 - إن صناعة الإسمنت هي صناعة ثقيلة تتطلب استثمارات هائلة على المدى الطويل وتحتاج إلى الاستقرار خصوصاً بالنسبة لأسعار مدخلات الإنتاج الرئيسية ( المواد الأولية ، الطاقة ، الوقود ) .
  - 7 - لقد كان لقانون حماية المنتج ، ومن بعده منع استيراد الإسمنت ، الأثر الفعال بعدم إدخال السمنت المستورد على الرغم من بعض الخروقات من هنا وهناك .

\* لقد ورد في توصيات اللقاء العربي حول دور شركات الإسمنت ومواد البناء في إعادة الاعمار المنعقد في بيروت للفترة من 17 - 18 / 6 / 2019 عرضاً لواقع صناعة الإسمنت العربية ، والتي بينت أن الطاقات العربية للإسمنت بلغت 337 مليون طن سنوياً وهي طاقات تزيد عن احتياجات البلدان العربية ، وتراجع الاستهلاك على مدى السنوات الماضية . إذ سجل أقل من 240 مليون طن سنوياً ، مشكلاً بذلك فجوة كبيرة بين الطاقات والإنتاج بفائض قدره أكثر 100 مليون طن ، الأمر الذي يحتم على صانعي القرار في البلدان العربية وقف التوسع في هذه الصناعة حالياً وتوجيه الاستثمار إلى مجالات أخرى غير الإسمنت .

ومن أجل الحصول على تنظيم أكثر فعالية لسوق السمنت ولتجنب سوء استخدام المواد وخصوصاً في ظل الأزمات المالية الحالية ، تم التوصية للحكومة وهيئات الاستثمار وقف منح تراخيص جديدة لمصانع جديدة حتى تنتهي حالة فائض الإنتاج . وفي تلك الأثناء بالنسبة للتراخيص الممنوحة بالفعل والتي لم يتم تحويلها إلى مشاريع على أرض الواقع فإنه تم التوصية أن تعطي آخر مهلة للتنفيذ على هذه المشاريع وبخلافه يتم إلغاء هذه التراخيص . حيث تم التنسيق مع جمعية مصنعي الإسمنت لإجراء دراسات سوق دورية منتظمة لتابعة تحولات السوق واتخاذ قرار مسبق وأن يتم منح تراخيص جديدة إذا ما علمنا أن عدد المشاريع التي تم دراسة الجدوى لها تقدر بأكثر من 40 مشروعاً حيث لم يتم التنفيذ على أرض الواقع سوى 5 مشاريع فقط .

## "نوعية الإسمنت ولونه شيان مستقلان تماماً، فجميع أنواع الإسمنت، مهما كان لونها، تمثل لنفس المعايير التي تحكم الأداء والتركيب"



مقابلة مع باسكال ديون  
مهندس بحث وتطوير - قسم تصنيع الاسمنت  
مركز أبحاث لافارج هولسيم - فرنسا

### 1. ما الذي يحدد لون الإسمنت؟ قد تكون هناك اختلافات في اللون بين منتجات الإسمنت نفسه التي يُنتج في مرافق

مختلفة، لماذا؟

يجد لون الإسمنت مصدره بشكل أساسي من أكسيد الحديد في الرواسب الطينية المستخدمة لإنتاج الكلنكر. لنتذكر أن كلنكر بورتلاند ينتج عن طريق حرق مزيج من الحجر الجيري (مزود الكالسيوم) والطين (السيليكون، الألومينا، ومزود أكسيد الحديد) بنسب قريبة من 20/80٪ لتشكيل مراحل تفاعل الإسمنت. يلعب أكسيد الحديد أثناء تصنيع الكلنكر دوراً في إحتراق الوسيط المساعد، إضافة إلى الألومينا. إن وجودها ضروري لتشكيل مراحل سيليكات الكالسيوم التي تسعى إلى استحضر المئات الميكانيكية ويتم التحكم في كميتها الإجمالية بدقة من خلال مُنتج الإسمنت. وفي نهاية العملية يتركز أكسيد الحديد وكميات ضئيلة من العناصر في مرحلة calcium aluminat ferrite وتدعى (C<sub>4</sub>AF) والذي يعد الطور الملون الوحيد من الكلنكر (البنّي إلى الأسود). لاحظ أن الإسمنت الأبيض مصنوع من مواد خام خالية من أكسيد الحديد.

وبالتالي وبالاعتماد على كيمياء الرواسب الطينية المحلية لمصنع الإسمنت، قد تختلف نسبة الحديد والألومينا قليلاً وتؤدي إلى كميات مختلفة من C<sub>4</sub>AF ومن ثم إلى إسمنت أكثر أو أقل ظلمة. هذا هو السبب في أن نفس الإسمنت المنتج في مرافق مختلفة لن يكون له نفس اللون تماماً.

بالإضافة إلى ذلك، قد يحتوي الإسمنت إلى إضافات من أجل ملاءمة خصائصها مع متطلبات السوق، إضافات من شأنها تعديل لون الإسمنت بعض الشيء. وقد تكون تلك الإضافات، اعتماداً على طبيعتها و أصلها، فاتحة (الحجر الجيري والخبث) أو داكنة (البوزولان والرماد).

العامل الأخير الذي له تأثير على لون الإسمنت هو نعومته، فكلما كان الإسمنت أكثر نعومة يصبح أفتح.

### 2. هل هناك علاقة بين لون الإسمنت و نوعيته/مواصفاته؟

كلا، فجودة الإسمنت و لونها مستقلان تماماً، ويتم التحكم بالأداء على الأغلب من خلال أطوار السيليكات (أبيض) والألومينات (أبيض) والقلويات (أبيض). فحتى C<sub>4</sub>AF يعتبر ذا تفاعل منخفض تماماً. وهناك أنواع من الإسمنت الداكن بمقاومة أكثر أو أقل كما هو الحال بالنسبة للإسمنت الفاتح. علاوة على ذلك، يغطي الإسمنت الأبيض إلى أقصى حد النطاق نفسه من المنتجات التي يغطيها الإسمنت الداكن.

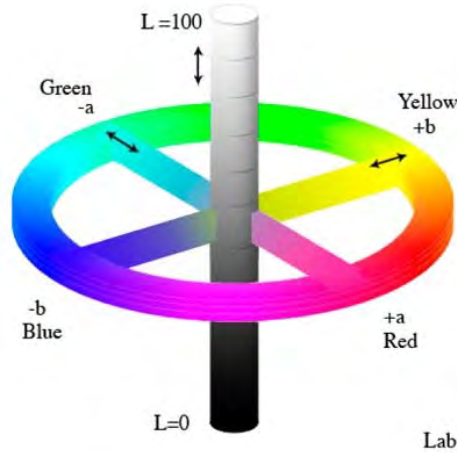
وعلى أي حال تمثل جميع أنواع الإسمنت، مهما كان لونها، لنفس المعايير التي تحكم الأداء والتركيب.

### 3. برأيكم لماذا هناك تصور في بعض الأسواق بأن الإسمنت الداكن يملك جودة أفضل بينما لا يملك الإسمنت الفاتح تلك الجودة؟

يختلف هذا التصور كثيراً من منطقة إلى أخرى. فعلى سبيل المثال، تجد أن الأسواق الأفريقية تفضل الإسمنت الأكثر قتامة بينما يبحث الزبائن في أوروبا الغربية عن منتجات فاتحة.

وفيما يخص تفضيل المنتجات الداكنة، فإن هناك فرضية تقول بأن الإسمنت الفاتح أقل نقاءً وبالتالي أقل جودة.

إضافة إلى ذلك، فإن لون المنتج النهائي (طابوق، ملاط أو خرسانة) يتأثر باللون أو بالإسمنت، ويمكن للمرء تصور أن العميل النهائي قد يشكك في وجود كمية منخفضة من الإسمنت في الملاط/الخرسانة حين تظهر أفتح لوناً. وبالتالي سيكون بيع المنتجات ذات الإسمنت الداكن أكثر سهولة.



تمثيل الفضاء اللوني  $L^*a^*b^*$   
(من photoscreen.com)

	$L^*$	$a^*$	$b^*$
CEM I darkest grey	52.8	0.7	10.3
CEM I lightest grey	64.7	0	10.5
CEM II darkest grey (fly ash)	50.8	0.2	7.4
CEM II lightest grey (limestone)	71.5	0.3	10.6
White cement	94.1	1.1	12.3

القياسات اللونية: عبارة عن القيم الإسمنتية النموذجية  $L^*a^*b^*$  والبقع اللونية المرتبطة بها.  $L^*$  هي المعلمة التي تُستخدم لمقارنة درجات قتامة الإسمنت (كلما كانت قيمة  $L^*$  منخفضة، كان الإسمنت أكثر قتامة).



الإسمنت الداكن ( $L^*=53$ )



الإسمنت الفاتح ( $L^*=62$ ) vs