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Deadlines for receiving articles, press releases, or advert materials for 2023 issues are as follows:

March issue: **7th March 2023**
June issue: **30th May 2023**
September (bonus) issue: **31st August 2023**
December issue: **5th December 2023**

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Arab NEWS

Algeria

Lafarge Algeria launchesChamil reduced-CO_2 cement

Lafarge Algeria has launched Chamil cement, a 40% reduced-CO_2 cement, which contains locally sourced clay and ferrous materials. The producer developed Chamil cement based on technology from the Rouiba Construction Development Laboratory.

Global Cement

Fire reported at GICA Group's Hadjar Soud plant in Algeria

A fire has been reported at Groupe des Ciments d›Algéries' (GICA) Hadjar Soud plant operated by Société des Ciments des Hadjar Soud (SCHS). An explosion occurred whilst narcotics and other substances were being incinerated in the plant's kiln under the supervision of the Gendarmerie Nationale. 12 people were injured in the incident including five workers at the plant, five police officers and two soldiers. Most of the victims suffered third degree burns in the blast and are being treated locally.

GICA holds the majority stake in SCHS, while Italy-based Buzzi Unicem owns a 35% share.

Global Cement

Egypt

Egyptian government doubles the price of gas for cement producers

The government has raised the price of gas to cement producers by 109% from US$5.75/ one million British thermal units (BTU) to US$12/MBTU. South Valley Cement, Misr Cement Qena, Misr Beni Suef Cement, and Sinai Cement all said that the higher gas prices would not affect the cost of production because they have switched to using coal.

Global Cement

ACC to start additional solar project

Aabian Cement Company (ACC) has signed an amendment to its 2019 contract with Amarenco SolarizEgypt (ASE) to establish a solar photovoltaic (PV) unit at its Suez plant. The amendment to the agreement aligns with updated regulations recently issued by the Egyptian Electric Utility and Consumer Protection Regulatory Agency (EgyptERA) to encourage and support self-built solar energy projects.

ACC already generates 20.6MW of power from a solar PV plant, representing 3% of its total power needs and saving 5500t/yr of CO_2. Construction of a second site, capable of saving 13,000t/yr of CO_2, will now begin in early 2023. The actual commissioning and start-up of operations is expected in September 2023.

Global Cement

Investor acquires US$5.66m-worth of Sinai Cement shares

The Egyptian Exchange has published a filing regarding the acquisition of US$5.66m-worth of Sinai Cement shares by an investor on 7 December 2022.

France-based Vicat holds the majority stake in Sinai Cement.

Global Cement

Suez Cement to undertake US$14.4m solar project at Suez cement plant

Suez Cement has partnered with Intro Power and Utilities for the construction of a 20MW solar power plant at its Suez cement plant. From its commissioning in early-mid-2023, the installation will provide the plant with 45GWh of energy, 20% of its annual consumption. Suez Cement says that this will eliminate 22,000t/yr-worth of CO_2 emissions. Construction is expected to cost US$350m and commence in 2023.

Suez cement aims to achieve specific CO_2 emissions of 400kg/t of cementitious product by 2030, down by 47% from 1990 levels.

Global Cement

Libya

Zliten Cement opens plant in Libya

Lafarge Algeria has launched Chamil cement, a 40% reduced-CO_2 cement, which contains locally sourced clay and ferrous materials. The producer developed Chamil cement based on technology from the Rouiba Construction Development Laboratory.

Global Cement

Morocco

NovaCim orders logistics software from Cachapuz for new plant in Morocco

NovaCim has ordered the SLV Cement logistics software product from Portugal-based Cachapuz for its forthcoming 1.2Mt/yr integrated cement plant in Ouled Ghanem in El-Jadida Province. The product is intended to improve and optimise dispatch processes. Denmark-based FLSmidth announced in 2019 that it was going to build the plant for TEKCIM in conjunction with the Société Générale des Travaux du Maroc (SGTM). The plant is expected to start production in 2023.

Global Cement

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CemWeek

SAUDI ARABIA

Cement sales up across Saudi Arabia as mega construction projects kick in

Saudi Arabia's local cement sales hit 1.45 million tons during the third quarter of 2022, up from 1.43 million tons in the corresponding period a year earlier.

Given the pipeline of projects in the country, local demand is set to increase, thus improving cement's selling price.

A surge in construction activities due to The Red Sea Development Co., AMAALA and other development projects in Saudi Arabia such as NEOM and Qiddiya is expected to drive the recovery of the cement industry after the demand dwindled last year and early this year on account of the pandemic.

Arab News

Yanbu Cement participates in largest ever Saudi Arabian carbon credit sale

Yanbu Cement was among successful bidders in Saudi Arabia's largest carbon credit auction to date earlier in November 2022. The Saudi Public Investment Fund (PIF)'s Voluntary Carbon Market Initiative Auction sold 1.4Mt-worth of carbon credits to 15 different entities, of which Yanbu Cement was the only cement sector representative. The PIF said that the sale will support the country's Saudi Vision 2030 development goal, while also advancing its progress towards net zero CO_2 emissions by 2060.

Global Cement

Saudi cement demand falls in 10 months

Cement demand in Saudi Arabia fell by nearly 1.4 million tons in the first 10 months of 2022 but remained robust compared with the slump during the Coronavirus pandemic.

From around 44.2 million tons in the first 10 months of 2021, cement consumption in the largest Arab economy declined to nearly 42.8 million tons in the same period of 2022.

Deliveries to local contractors dipped by around 1.9 percent to 41.8 million tons from nearly 42.6 million tons in the same period, the report showed.

In 2021, cement demand increased by nearly 4.6 percent due to an upsurge in public projects as part of the Gulf country's Vision 2030 economic diversification strategy.

Demand stood at around 53.4 million tons in 2021 compared with 51.08 million tons in 2020.

Saudi Arabia, which controls the world's second largest recoverable oil resources, is the largest Arab cement producer, with output peaking at over 60 million tons in 2015 before it receded in the following years.

Zawya

Arabian Cement considers status of upgrade project

Arabian Cement says it is considering how it can complete work on the construction of new cement mills at its integrated Rabigh plant. The announcement follows a statement from the cement producer reporting that contractor China National Building Materials Company (CNBM) said that it was unable to complete the project due to the necessity of "involving a third party." The project has suffered repeated delays, such as Covid-19-related travel bans, and dates back to at least 2015.

Global Cement

Qassim Cement to acquire Hail Cement

Qassim Cement has concluded a non-binding memorandum of understanding (MoU) with Hail Cement for acquisition of the latter's issued shares. After any acquisition takes place, Qassim Cement plans to issue US$377m-worth of share capital in favour of Hail Cement's existing shareholders.

Global Cement

Sinoma and Yamama Cement sign contract for 10,000 t/day clinker line

China-based Sinoma has signed a contract with Yamama Cement for the construction of a new 10,000t/day clinker production line at its new plant site. The announcement of the engineering, procurement and construction (EPC) contract came shortly after the news that Sinoma had been contracted to dismantle, move and rebuild one of Yamama Cement's existing cement production lines in a strategic move between the producer's old and new plant sites.

Global Cement

Yamama Cement commissions new cement plant

Yamama Cement has commissioned its second cement plant, with 20,000t/day in capacity across two clinker lines. The producer invested US$1.25bn in the plant's construction, which was carried out by Germany-based ThyssenKrupp. The facility is equipped with seven raw materials crushers, a 3.7km-long limestone conveyor belt, 110,000t of storage capacity, four Quadropol roller mills, two Dopol preheater towers, two Polro rotary kilns, two Polytrack clinker coolers, three 100,000t clinker silos, four Polycom high-pressure roller mills, six 22,590t and 25,000t cement silos and 22,000m³ in water storage basins. The new plant is situated in the eastern Arabian Desert, 80km from Riyadh.
Yamama Cement also operates the 6.4Mt/yr Al Kharj Cement plant, 70km from Riyadh.

Global Cement

UAE

Asian Paints and Partners to Set up White Cement Plant in Fujairah/UAE

Asian Paints of Mumbai, India is planning to form a joint-venture for building a new white cement plant in Fujairah, UAE. A binding term sheet has been signed with limestone mining company Riddhi Siddhi Crusher & Land Transport, raw materials supplier Associated Soap Stone Distributing (ASD) and other companies. The capacity of the plant is said to be 265.000 tons p.a. White cement is a key raw material for both the manufacture of powder paints and the home construction and repair segment. Also, Asian Paints plans to set up clinker grinding units in India.

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Emirati government signs four alternative fuel agreements with cement producers

The Ministry of Climate Change and Environment (MOCCAE) and Emirates RDF have signed four memoranda of understanding (MOU) with Fujairah Cement Industries, JSW Cement, Lafarge Emirates and Star Cement to use alternative fuels produced by the Emirates RDF in the Umm Al Quwain Emirate in their manufacturing operations.
Emirates RDF's plant treats and transforms municipal solid waste (MSW) from Umm Al Quwain and the emirate of Ajman into refuse derived fuel (RDF). The ministry said in a statement that MOUs are part of its support for integrated waste management projects that treat waste and transform it into economic resources in line with the Ministerial Decree No. 98 of 2019 on using RDF in cement factories. Cement plants in the UAE will be encouraged to meet 10% percent of their total thermal energy needs using RDF.

Global Cement

International News

Mondi has expanded its paper bag footprint in Morocco

- Mondi has started production at its €16 million plant in Tangier (Morocco), increasing production capacity in West Africa to over 500 million bags each year.
- Investment builds on Mondi's existing expertise to meet growing demand for paper bags in the area.
- Mondi uses sack kraft paper made at its own mills, helping to ensure security of supply of packaging materials.

Mondi, a global leader in sustainable packaging and paper, has started production at its €16 million greenfield plant in Morocco, which can produce 100 million paper bags each year.

This brings Mondi's total capacity in West Africa to over 500 million bags annually, helping to meet the growing customer demand for paper bags in the region. This plant is Mondi's fourth site in West Africa (in addition to two plants in Morocco and one in Ivory Coast).

The sack kraft paper used by these locations is produced by Mondi, helping to ensure security of supply of packaging materials to the region's building industry. In addition, Tangier is ideally located within a free economic trade zone making it well positioned to supply to neighbouring countries.

Hicham Jalal, Mondi's Regional Manager West Africa Paper Bags, comments: "It is really exciting to see the growth in the West African building industry. Mondi is uniquely positioned to deliver paper-based packaging materials directly to customers in the region, who benefit from a reliable supply of high-quality paper bags and local services."

Claudio Fedalto, COO Paper Bags, Mondi, adds; "This investment illustrates our commitment to growing our offering of sustainable packaging through our integrated value chain. Thanks to the excellent work and spirit of the local team, we secured, progressed and turned this project around incredibly quickly. Work on the ground started in January 2022, and we have already started production at our new plant. This excellent achievement was only possible thanks to the highly motivated local team."

About Mondi
Mondi is a global leader in packaging and paper, contributing to a better world by making innovative solutions that are sustainable by design. Our business is integrated across the value chain – from managing forests and producing pulp, paper and films, to developing and manufacturing sustainable consumer and industrial packaging solutions using paper where possible, plastic when useful. Sustainability is at the centre of our strategy, with our ambitious commitments to 2030 focused on circular driven solutions, created by empowered people, taking action on climate.

In 2021, Mondi had revenues of €7.0 billion and underlying EBITDA of €1.2 billion from continuing operations, and employed 21,000 people worldwide. Mondi has a premium listing on the London Stock Exchange (MNDI), where the Group is a FTSE100 constituent, and also has a secondary listing on the JSE Limited (MNP).

www.mondigroup.com

Schenck Process successfully completes sale of mining business to Sandvik AB

Schenck Process has finalized the previously announced sale of its Mining business (SP Mining) to the Swedish engineering group Sandvik AB. As one of the market leaders in screening, feeding, screening media and train loading solutions with a strong aftermarket business, SP Mining will not only complement Sandvik's existing product offering but also benefit from a greater global reach. With the closing, the Mining business is to be integrated in the Stationary Crushing and Screening division of Sandvik's Rock Processing Solutions (SRP) business area.

With the sale of the Mining business, Schenck Process will sharpen its portfolio and allow the Group a more focused growth trajectory, cementing its position as a global solutions provider for the Food, Chemicals and Performance Materials industries, as well as Infrastructure and Energy.

About Sandvik Group
Sandvik Group Sandvik is a global, high-tech engineering group providing solutions that enhance productivity, profitability and sustainability for the manufacturing, mining and infrastructure industries. We are at the forefront of digitalization and focus on optimizing our customers'

processes. Our world-leading offering includes equipment, tools, services and digital solutions for machining, mining, rock excavation and rock processing. In 2021 the Group had approximately 39,000 employees and revenues of about 86 billion SEK in about 150 countries within continuing operations.

About Schenck Process
Schenck Process is a global provider of sustainable products, integrated solutions, and services in mission-critical applications for bulk materials. Headquartered in Darmstadt, Germany, the Group prior to the Mining sale has around 3,100 employees with a presence in over 21 countries across six continents focused on the food and mining markets, alongside chemicals and performance materials, and infrastructure and energy.
The product offering includes solutions for industrial weighing, feeding, conveying, pulverizing and classification, screening, mixing, and blending, and associated digital applications.

Magenta (Egypt) finalizes a complete new plant with SACMI

First stage finalized for the production of 200.000 pieces per year with a future output, once the expansion phase has been completed, of 1 million pieces per year. The focus of the project were the complete solutions for body and glaze preparation, mould production and the casting department. An ambitious plan as regards the level of automation and sustainability with the introduction at the factory of SACMI RobotGlaze and the high-efficiency Riedhammer kiln. SACMI also supplied the complete modelling developments.

Based in the region of Suez, Magenta thinks to the future investing in a new plant which, once in full production, will reach a factory output of 1 million pieces per year of high-quality ceramic sanitaryware. SACMI supplied the complete solutions for body and glaze preparation, the dryer and automated systems, machines for casting and moulds. The new shuttle kiln was supplied by SACMI group company Riedhammer.

Planned and carried out according to a fast schedule, the first step of the project has just been inaugurated for a production output, during this first stage, of 800 pieces per day, equal to 200.000 pieces per year with a varied article production mix.

In particular, the customer installed and started up a new BCV090 casting bench for WC bowls, complete with curtain dryer for double casting, a demoulding system and lifting device as well as deposit conveyor belts. Equipped with 45+45 moulds, the solution sits alongside a second machine, the BCC130, for 2-part pieces such as wash-basins, pedestals, lids and oriental toilets, for a total of 65+65 moulds installed. The casting department is completed by the BCC080 for the production of water tanks, similarly equipped with mould dryer and accessories.

The entire plant layout is set up taking into consideration the future expansion phase. A wide and complete range of production is expected to include both items made of Vitreous China and Fine Fire Clay. The decision of the customer to use both traditional casting systems as well as a good level of automation can be seen in the mould production, body and glaze preparation departments with the supply of the plaster mixing system and related 80-pallet dryer, followed by the dryer for the cast pieces manufactured in SACMI and equipped with 32 cars for 2 drying cycles per day.

In a similar way, the manual glazing booths are operated alongside a SACMI-Gaiotto robotized cell which will be able to handle the majority of the operations, leaving just coloured or special pieces for manual glazing. The cell is equipped with all the latest-generation solutions such as the Mass Control® system for the optimization of the glaze flow-rate and the SACMI GDA80 "zero maintenance" spray-gun. Completing the supply is the Riedhammer HWS 15/500/140-G kiln - including high-efficiency Pulse Firing burners - equipped with 10 cars and automatic transfer system.

Designed for the international market and for high quality and design production, Magenta's project also saw SACMI as supplier of the complete modelling developments. Of particular interest within this project was the development of 4 models of "rimless" wall-hung WC bowls and a further 5 floor-mounted models to cover the wide and varied market demand.

Upon the customer's request, and in line with their company strategic planning, the complete design and development of the new models was carried out at SACMI Whiteware's Laboratory, with the specific aim of meeting the rising demand for certified quality products in compliance with European UNI EN997 standards. This carefully chosen strategy places Magenta Ceramics at the top level of the market among the ceramic sanitaryware manufacturers in Egypt and the entire North African region.

Sika Final Takeover of MBCC Targeted for the First Half of 2023

Sika AG of Baar, Switzerland, has now targeted the closing of MBCC Group (former BASF Construction Chemicals, Mannheim, Germany) for the first half of 2023. Reason for this delay (the completion of the takeover was planned by end-2022) is an announced in-depth examination by the UK Competition and Markets Authority (CMA). Sika has already obtained unconditional acceptance of the takeover by many relevant anti-trust authorities worldwide (e.g. by Brasil, China, Japan, Saudi Arabia, Thailand and Turkey). According to Sika, synergies amounting to around 170 mio Euro per year can be expected after completion.

drymix.info News 274/2022

I-Tech supplies digital decoration solutions to Arabian Ceramics

The Jeddah-based ceramic tile producer will install G.O.D., I-NKFILLER and I-MILL systems to improve its manufacturing performance.

Arabian Ceramics (Jeddah), a subsidiary of Kab Holding (owned by Sheikh Khalid Ahmed Bagedo) and one of the largest tile manufacturers in Saudi Arabia, has commissioned I-Tech to supply three systems for the digital decoration phase with delivery scheduled by the end of the year.

They consist of a G.O.D. (Glaze On Demand) system for the automatic distribution of glazes and engobes from the preparation area to the various points of use on the glazing lines; an I-NKFILLER system for the automatic feeding of inks to digital printers; and an I-MILL system for the production of digital ceramic inks.

According to Arabian Ceramics' technical director Carlo Ciamaroni, the three systems will make a significant improvement to both production efficiency and finished product quality.

https://ceramicworldweb.com

LB supplies plant to Arabian Ceramics for its Jeddah facility

Arabian Ceramics has commissioned LB to supply an Easy Color Boost dry colouring system, press feeding systems (belts and conveyor) and a slip colouring system for its Jeddah factory.

The aim of the Saudi Arabian company, one of the country's leading ceramic tile producers, is to improve the quality of powder colouring for porcelain tile production.

LB designed a complete, customised technical solution that would meet the company's need for meticulous engineering and a system capable of integrating seamlessly with the existing plant.

The plant supplied to Arabian Ceramics will be one of the first in the country for porcelain body powder colouring with high-capacity hydraulic press feeding.

The project is currently under development and is due for start-up by end 2022.

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The Russian-language periodical professional publication devoted to the production of cement and other binders, concretes, dry mixes and their applications, as well as to research and design.

A conspicuous place in the journal materials is given to the problems of plant development, capital movement, economic problems facing the cement industries of Russia and other countries.

The journal comes out once in two months and includes news, analytical materials and detailed abstracts of all the articles in English.

«Cement and its Applications» is the only initiator and organizer of international cement conferences PetroCem. PetroCem 2018 which was held on April, 2018 in Saint-Petersburg, Russia – gathered more than 520 participants from 36 countries and representing more than 320 companies.

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Atlas Concorde announces forthcoming construction of large slab plant

Detail of the photovoltaic system

Atlas Concorde, one of the leading global players in the ceramic tile industry, has announced an investment of more than €60 million for the construction of a new porcelain slab production plant at its site in Finale Emilia (Modena).

The new plant, which will expand the existing factory by an additional 35,000 square metres, will be equipped with the most advanced production technology and will achieve the highest standards of environmental sustainability in the industry, demonstrating Atlas Concorde's commitment to a zero-carbon future.

The facility will be equipped with a photovoltaic system capable of generating up to 3,850 MWh per year, effectively reducing CO_2 production by 2,000 tonnes . It will also have a very low level of pollutant emissions and will be hydrogen ready in preparation for the future introduction of hydrogen into the production process.

The plant is already under construction and is expected to begin production in June 2023, increasing the number of jobs at the Finale Emilia site by approximately 60%. This latest investment aims to strengthen the company's position in the large ceramic slab segment and follows the €160 million already allocated by Atlas Concorde for industrial and logistical development over the last five years.

https://ceramicworldweb.com/

Aerial view of the extended area of the Finale Emilia site

LAMINAM accelerates the transition to carbon neutrality

Building a sustainable and environmentally friendly production model while accelerating the process of electrification and decarbonisation of a hard-to-abate and gas-intensive sector such as ceramics is the aim of the partnership agreement between Enel and Laminam set out in the memorandum of understanding signed by the two companies in May.

The agreement between the multinational energy company and the leader in the field of large ceramic architectural slabs includes several joint initiatives. One of these is an innovative pilot project for full electrification of a factory (beginning with the one in Fiorano Modenese), where the production process will undergo a complete plant and energy overhaul. There is also a plan to revamp the other Laminam facilities currently operating with fossil fuels through electrification, energy efficiency and the development of renewable energy sources (photovoltaics and energy storage systems).

The agreement also includes initiatives in the field of renewable distributed power generation (with the possible creation of Energy Communities) and solutions aimed at optimising energy costs such as peak power reduction and load shedding.
Enel, founded 60 years ago, is the world's largest private renewable energy operator, the top grid operator in terms of number of end users (75 million) and the world leader in demand response. Enel produces energy with a total capacity of over 90 GW.

Enel Green Power is responsible for managing renewable resources and has a total capacity of more than 54 GW with an energy generation mix that includes wind, solar, geothermal, hydroelectric and storage plants in Europe, the Americas, Africa, Asia and Oceania.
Enel X Global Retail, the global advanced energy services business line, has a total capacity of about 6.6 GW of globally managed demand response and 59 MW of behind-the-meter storage capacity.

Mohawk Industries acquires Brazilian company Elizabeth

The deal will be finalised in the first quarter of 2023 and will establish Mohawk Industries as the market leader in terms of value in Brazil, where it already operates with Eliane.

Just a few months after finalising an agreement to acquire Mexican company Vitromex (the transaction is expected to close in the first half of 2023, subject to government approvals), Mohawk Industries is looking to expand further in Brazil, where it has already been operating since 2018 through Eliane.

On 3 November, the group announced an agreement to purchase Elizabeth Revestimentos, a company founded in 1984 in Joao Pessoa in the state of Paraiba. Elizabeth has four manufacturing units located strategically throughout the country to optimise distribution: two for the production of porcelain tiles in the State of Paraiba and two for the production of ceramic tiles in Criciuma (Santa Catarina) and Goianinha (Rio Grande do Norte).

One of the top 25 companies in Ceramic World Review's ranking of the world's largest tile producers, Elizabeth declared a production capacity of approximately 56 million square metres and an actual output of 42.8 million square metres in 2021, as well as revenues of €197.5 million.

Following this latest transaction, which is expected to close in the first quarter of 2023, Mohawk Industries will become the largest ceramic tile producer by value in Brazil. The synergies generated by Eliane and Elizabeth's combined business will leverage their respective strengths, enhancing the product offering, operational efficiencies and service capabilities.

Once finalised, the acquisitions of Vitromex and Elizabeth will bring the American flooring multinational an additional capacity of around a hundred million square metres, further enhancing its position as the world leader in the ceramic tile sector.

www.ceramicworldweb.com

Gmm Group joins Swedish giant Axel Johnson International

Axel Johnson International enters the Italian distribution and industrial services market by acquiring a majority stake in Gmm Group.
Swedish group Axel Johnson International has finalised the acquisition of a majority stake in Gmm Group, a leading distributor of mechanical components for the ceramic industry based in Fiorano Modenese. The deal will enable the Scandinavian giant to enter the Italian distribution and industrial services market.

Founded in 1973 by Attilio Milani, the Gmm Group rapidly established itself as a leading distributor of mechanical components for the Italian and international ceramic industry.

Driven by the enthusiasm and vision of the second generation of the family led by Silvia and Luca Milani, over the years the group has also expanded into the field of specialised maintenance services through a process of strategic vertical diversification. In 2016 it acquired Bbm Industrial Maintenance and opened Gmm USA in Clarksville, Tennessee, then in 2020 the group was further expanded with the acquisition of E. Malaguti, a company specialising in the reconditioning of electromechanical components. Gmm Group now has around 50 employees and expects to post a turnover of more than €20 million this year.

CEO Luca Milani retains a substantial minority share and under the terms of the agreement stays on at the helm of the group.

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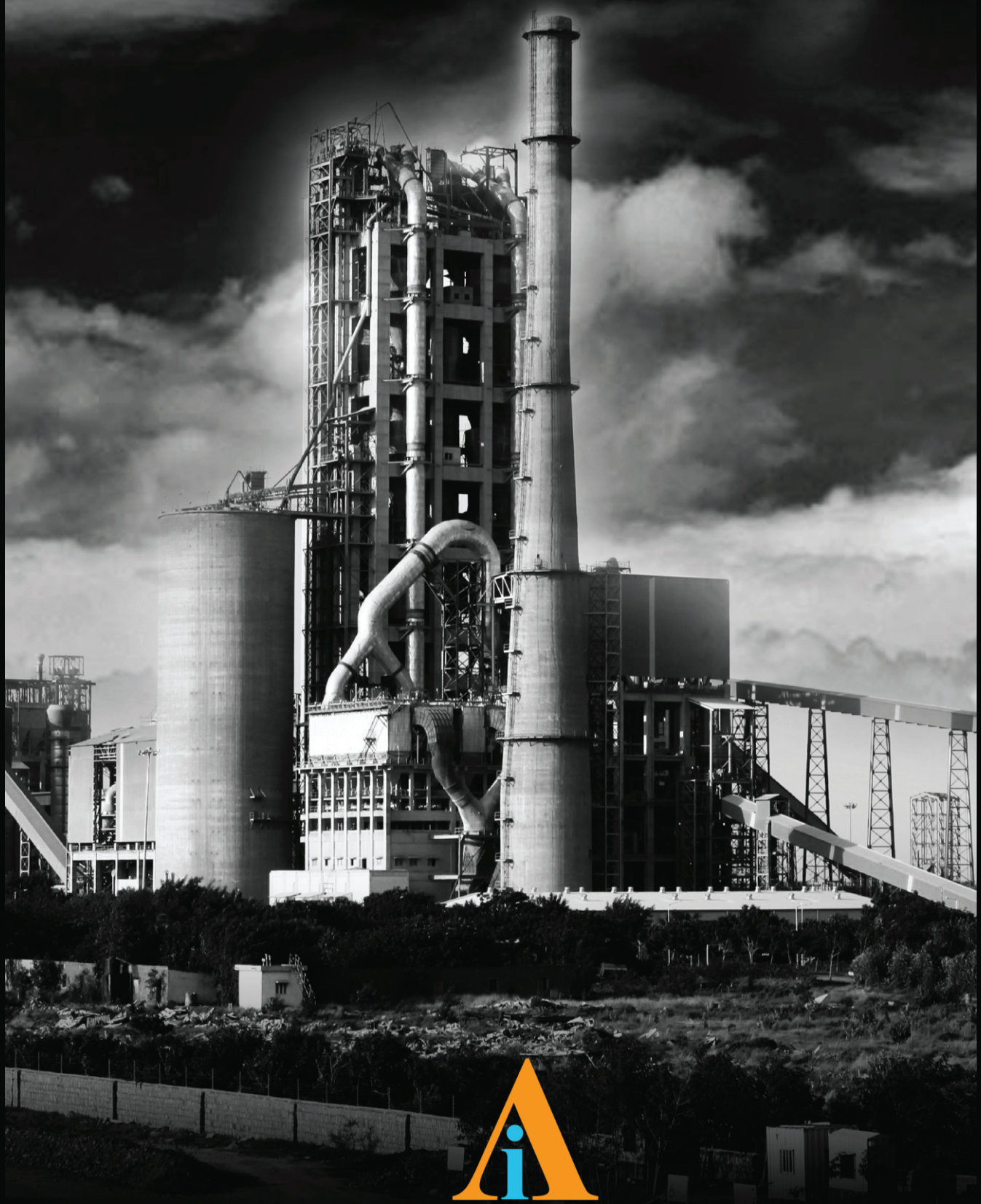

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PRE-ENGINEERING ENSURES PLANNING RELIABILITY

Plant manufacturer and process expert Glatt uses pre-engineering to put investment decisions on a firm basis and enables its customers to bring forward sub-projects

”Successful pre-engineering is the mental anticipation of all project contingencies - and it’s done before investment decisions are made.” No expensive surprises. Clifford Schäfersküpper, Glatt Ingenieurtechnik, uses practical examples to explain what is important in pre-engineering.

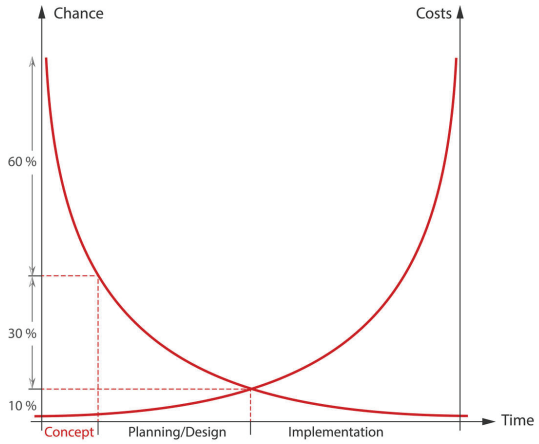
Foresight is not only required in chess: careful consideration of alternatives during the concept phase also ensures successful implementation in plant engineering

To stay ahead in the race for successful new product launches, the concept phase is crucial. Plant manufacturer and process expert Glatt uses pre-engineering to put investment decisions on a firm basis and enables its customers to bring forward sub-projects.

Preparing to make an investment decision can bring beads of sweat to the foreheads of R&D experts, product developers and founders alike. Often, they lack an overview of the project’s scope and details, and have to assess both risks regarding future operations and the profitability of possible alternatives. Gathering realistic data and facts sometimes exceeds the capacities and specific know-how of those in charge of the preparation process. As such, assumptions and vague estimates can lead to inaccurate project funding, as well as milestones and potential benefits not being achieved. Newspaper headlines about out-of-control projects vividly demonstrate how costly and damaging to a company’s reputation this can be. As a result, engineering expertise is crucial prior to investment decisions being made. Plant manufacturer and process expert Glatt offers pre-engineering solutions and develops realistic cost estimates. Industrial customers know Glatt primarily from the pharmaceutical sector, wherein pre-engineering phases are common. Pharmaceutical companies often experience a high level of competitive pressure, strict regulations and complex processes with frequent product changes. In these cases, parallel engineering and early planning services during the early stages of making an investment decision can avoid expensive changes later in the project and bring new developments to market quickly. These concept studies however also have value in the chemical, food and feed industries. In fact, each pre-engineering phase improves both Capex estimations and subsequent Opex forecasts, which results in a more realistic picture of the customer‘s overall business case.

The early concept phase

In the role of the future plant builder, Glatt prepares basic documents during the early concept phase that are fundamental for the direction of a project and form the basis for the subsequent engineering and construction of the plant. Possible project and product risks that



Influence of planning on investment costs: in the concept phase, major changes are possible with only minor effects on costs, in the realisation phase, even small deviations usually cause considerable costs

could delay or impact the project are identified early on and tracked separately. The precise description of the specified "work order" makes it easy to identify potential deviations from the plan. Furthermore, any risk of escalating changes and associated cost increases are reduced or even avoided. A project map should also be included at the beginning that provides a 360° view of all existing plant areas and equipment – as well as those to be purchased – and gives an overview of the total investment and any interfaces. All relevant areas should be shown in the process flow diagram, including an initial interface list.

The equipment list initially details the main equipment, including dimension and weight data, which Glatt generates from databases or from empirical values of completed projects. The weight data considers the separate states of "empty", "in operation" and "in the event of a disaster", provides information about structural safety requirements and constitutes an important basis for the structural engineering concept planning. Of course, documentation is updated during the course of the project and, ultimately, contains all the necessary information including room co-ordinates, connection types and process conditions.

Consumption and connected values

Pre-engineering also provides concrete figures with regard to the expected economic efficiency of a system. Connection values are included in the investment costs and consumption values determine the economic efficiency during operation. At Glatt, the experience has been made that many companies estimate operating costs incorrectly because they use the higher connection values as a basis. In laboratory tests at the company's technology centre in Weimar, the engineers determine the consumption values that can be expected from fluidised bed systems, for example. At the same time, they investigate the in-principle feasibility of the process and calculate the engineering design costs on the basis of the determined process data.

For technologically demanding products with special properties, additional scale-up trials on a pilot plant are offered to confirm the test data, operational parameters and, ultimately, the quality of the required product. All those engineering services are basically technology-independent. The engineers determine the most economical solution with the most suitable process technology for each customer.

Planning phase	Advantages
Basic documents	Provides a precise project scope and the basis to advance any associated sub-projects
Project map	Provides an overview of all new and existing plant areas and utilities required
Process flow chart with interface and equipment list	Visualizes all new areas, including interfaces, equipment, battery limits, etc.
Consumption/connection values	Describes data acquisition routes, such as via laboratory and pilot tests and scale-up
Layout draft	Visualizes buildings and facilities with defined areas and variants (if necessary)
Preliminary schedule	Timetables processes, interrelationships, milestones, etc.
Preliminary process description	As part of the concept report and/or specifications, provides a basis for operating instructions
Concept report	Details the results of all preceding steps with explanations
User Requirement Specification (URS)	Part of the contract, the URS defines the scope of the order
Cost	Pricing within a ± 30% estimate
Alternative variants	Lists locations with additional/reduced costs and installation variants with different product flows
Revamping	Modernisation of an existing plant

Pre-engineering steps and their advantages

Data from such concept phases ultimately allows Glatt to be contractually responsible for important project and product parameters in the event of a continued assignment, and relieve the customer of important project risks.

From the bird's eye view

The next step is a preliminary layout – the bird's eye view of future production. From numerous projects on almost every continent, the specialists know what space needs to be reserved for operating, staging and maintenance areas, as well as escape routes. This wealth of experience also flows into the rough time schedule, which serves as a roadmap from the time the contract is signed.

At the end of the concept phase, the planners prepare a concept report, which usually contains a preliminary process description and later forms the basis for the process and operating manual. By commissioning the preparation of these specifications, the client minimises an important risk: price and approval-relevant quantity thresholds for hazardous substances, according to the Federal Immission Control Act, for example, can be clarified. A complete set of specifications reduces the amount of uncertainty in the cost estimate to well below 30 %. This increases planning security and provides objective, reliable specifications for project control.

Any questions regarding the most economical solution are best answered by alternative variants. To this end, Glatt not only calculates process and setup-related options, but also international location variants, as well as structural or design alternatives, which are examined and evaluated in the concept phase. This also applies to the expansion of brownfield projects. If Glatt is subsequently commissioned, various contract models are conceivable – from the different variants of an EP contract to a turnkey project.

Revamping: more than optimisation

To increase the value retention and performance of an existing plant, all production and consumption data generated during operation are put to the test during revamping. This provides an opportunity to discuss installation variants and to substantiate conceptual considerations with realistic figures. In any case the goal is to be technically state-of-the-art and to improve overall production. Improvements can be made, for example, with more economical or energy efficient operation, by using more contemporary handling/ergonomic solutions and/or by increasing production capacity. However, whether it is an existing plant or a greenfield project, when it comes to the efficient implementation of investment projects, the secret of success lies in the concept phase. With technology-independent pre-engineering, reliable data at all levels are available.

An essential part of pre-engineering is a layout plan of the main equipment - here with a fluid bed granulator as the heart of the plant

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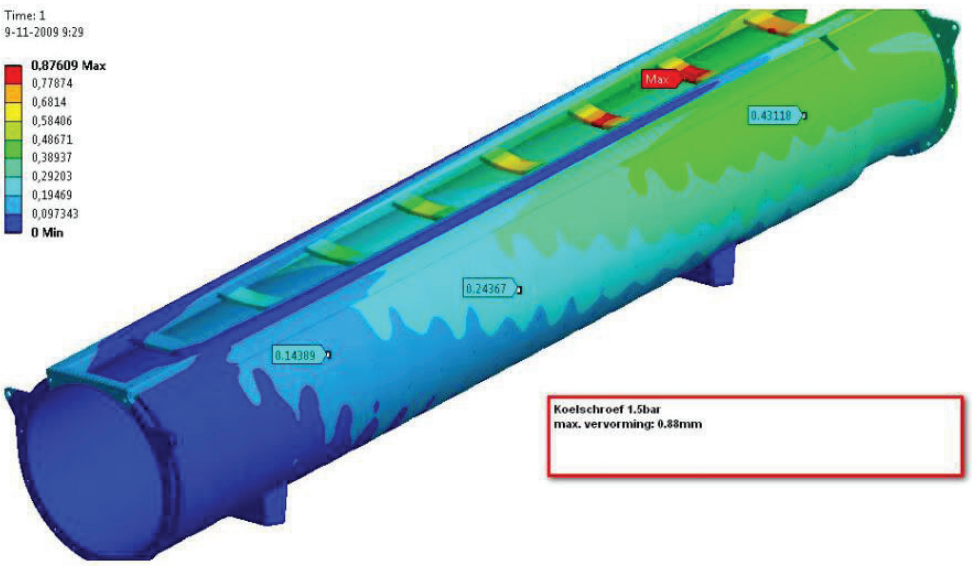
KLINKENBERG SCREW HEAT EXCHANGERS THERMO LINE

Screw heat exchangers from Klinkenberg Zaanstad are a very energy-efficient solution in comparison with the usual cooling and heating methods.

Screw heat exchangers are excellent pieces of equipment for use in thermal processes where continuous processing is desirable.

Screw heat exchangers a closed system, this is always advantageous, but strictly necessary if toxic vapours are released during the process. At the testing facility at Klinkenberg Zaanstad, your process can be fully evaluated for heat transfer and product changes during the heating or cooling of the material.



Screw heat exchangers

Screw heat exchangers

Screw heat exchangers

The Klinkenberg KTL gamma consists of six products for the cooling, heating or retention of a product. The Thermfrost is a screw heat exchanger with one or two shafts. Depending on the parameters and the available space, you can opt for cooling by the jacket, the shaft and/or the screw flights.

The Magma is similar to the Thermfrost and also consists of a single or double shaft heat exchanger. Again, depending on the parameters and the available space, you can opt for jacket, shaft or screw flight heating.

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Three new N-Eupex couplings and optimized flexible elements

- **Expansion of the N-Eupex modular system by the coupling variants N-Eupex ERN with slipping unit and N-Eupex B with clamping element**
- **Introduction of the short version DKS represents the shortest double-cardanic solution on the market**
- **New TPU-based elastomers for increased torque capacity**

Flender is expanding the portfolio of its flexible coupling series N-Eupex by introducing three new types. The new products allow users additional flexibility in their systems without losing the compact design and high load capacity of a pin coupling.

N-Eupex ERN

The new N-Eupex ERN is equipped with a torque limiter, which provides even more security in the drivetrain in many applications. The coupling variant allows users to specify a maximum torque so that critical torques for the motor and output machine are not transmitted.

The three new couplings N-Eupex ERN with torque limiter (right), N-Eupex B with clamping element (left) and N-Eupex DKS with shortest double-cardanic design (center).

Machines and systems are protected from overload and damage, thus significantly increasing system availability.

N-Eupex B with clamping element

With the N-Eupex B plus clamping element, Flender introduces a second new coupling that ensures frictionally engaged clamping connections. In this case, the plain, cylindrical machine shaft end is connected to the coupling hub via a clamping connection without a feather key and service ability is increased. For example, assembly or replacement of worn elastomers can be carried out much more easily.

No connecting machine components must be moved, the time required is halved and so is the downtime of the machine.

N-Eupex DKS

With the N-Eupex DKS, a new double-cardanic coupling is introduced as a «short version» into Flender's modular system. While the DK type, which was launched in 2020, addresses the pump market with standard expansion pieces for normed shaft distances, the DKS is the shortest possible double-cardanic solution for the market. The shortened overall length enables cost-optimized use with a small shaft distance dimension without losing the advantages of a double-cardanic coupling connection.

Extension of elastomers

New elastomers for the pin couplings round off the modular extensions. In addition to the previously used rubber elements made of NBR, Flender now also offers elastomers made of thermoplastic polyurethane (TPU). Following the torque increase for all N-Eupex couplings with NBR packings in 2020, the use of TPU packings allows the power density to be increased by another 20 percent on average. For sizes 300 and above, the familiar NBR elastomer is combined with fabric inserts and the torque capacity is again raised.

«With a view to the long tradition of cam couplings, our development engineers are systematically working on increasing the variety of combinations even further. The 2022 enhancements give our users a wide range of sustainable options for optimizing their machines and systems even more and reducing maintenance,» explains André Artmann, Head of Coupling Sales.

EXPLOSION PREVENTION WITH GSME AND HOTSPOT DETECTOR

With the GSME and HOTSPOT detectors from REMBE, an artificial intelligence has been created that detects fire and explosion events at an early stage.

The GSME detector is an artificial nose, ”trained” for pyrolysis - popularly known as smoldering gases, while the HOTSPOT detector represents an artificial eye that already detects surface temperature changes of 1°C.

REMBE´s HOTSPOT X20 measures surface temperatures using an intelligent evaluation system, which divides the field of view into detection zones. A separate temperature threshold value can be set for each individual zone in order to tailor the detection to the process as far as possible. The HOTSPOT X20 can even identify small temperature increases (1°C) and enables to warn the operator of a fire or glowing embers at extremely early stages. The HOTSPOT X20 can also be used in explosion atmosphere up to zone 20 and under high dust loads and monitors a temperature range in the standard version of 0-200°C (higher temperatures possible, but typically not required).

Mainly hydrocarbon compounds are released when many substances thermally decompose. If there is incomplete burning without a flame and a low oxygen supply, carbon monoxide is created as well. The GSME X20 pyrolysis gas detector, for instance, has been designed for detecting these gases, even as they develop. Alongside carbon monoxide and hydrocarbon compounds, nitrogen oxide and hydrogen compounds (CO, HC, H_2 and NOx) are also monitored. With the aid of an intelligent evaluation algorithm, a process behaviour can be ideally mapped and normal off-gasing be adopted. If a concentration increases above the usual level, the GSME X20 immediately triggers an alarm. The detector, is also suitable for explosion atmospheres up to zone 20, monitors concentration ranges from 0-100ppm.

When the location and mounting position are ideally designed in an explosion protection concept, HOTSPOT X20 and GSME X20 allow explosions and fires to be prevented through early detection.

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SAMPLING AS A QUALITY ASSURANCE TOOL

WEMO technique supplies a complete package of equipment and the know-how to obtain representative samples - automatically or otherwise - in order to guarantee the quality of production processes.

Based on its decades of experience with worldwide projects in the feed, food and chemical industry, WEMO-techniek is in a position to recommend the optimum solution for every sampling challenge. Whether it is a fine powder or coarse grain, a raw material or end product, one or more positions; the systems of WEMO-techniek ensure representative samples. The programme varies from manual or air-operated sampling at one position to fully automated sampling at several positions, including transport, collection, packaging and labelling.

Sampler

With a range of standard samplers, most customers can be served directly. For a special application, it is possible to adapt a standard sampler or design a customised solution from a blank sheet.

Sampler with hand slide

Automation

In easily accessible places, a sampler can be operated manually, whereby the material is collected via a hand slide in a bag or container, or in a screwed-on sample container. It is a small step to automate sampling from this system. A product sensor secures the sample and the operator receives a signal that the sample can be collected. In this way, a single sampling system can be extended to collect a series of samples during a production run.

Sample packer and grit tester

Sample packer

The sample packer from WEMO-techniek can take multiple sub-samples fully automatically, collect them, pack them in a bag and then label it. This high-end solution meets all track & trace requirements and forms the heart of the quality assurance in a process.

WEMO samplers

Automated Carousel sample taker

Carousel

Samples can be brought to a central point from several positions in the factory by vacuum transport. The material ends up in individual sample containers in a customised carousel or in the sample packer mentioned above. By integrating the control system into the factory automation system, operators in the control room have continuous insight into the sampling process.

Testing

Since 2016, WEMO-techniek has been producing the Kempink wear resistance tester for pellets. This 'grit tester' can be supplied in an automated system as an on-line solution. The company has also developed a hardness tester. This can be combined with the grit tester and will soon also be available as a laboratory version.

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Premier revolutionizes slabs and tiles lapping by designing a tool, The Orbiter, which transforms a cylindrical head into the most powerful and accurate lapping system ever made

ORBITER consists of 5 cylindrical tool-holders equipped with 7 tools each, assembled on the spindles of a cylindrical head that develop a cutting power 2.5 times higher than a Fickert head.

The tools of the ORBITER are arranged radially and describe a circular trajectory with a radius of 110 mm., this allows them to perfectly follow the surface of the slab, equally machining points in relief and depressions, thus obtaining the highest quality and uniformity of processing.

ORBITER is an innovative lapping system, which uses standard Fickert tools.

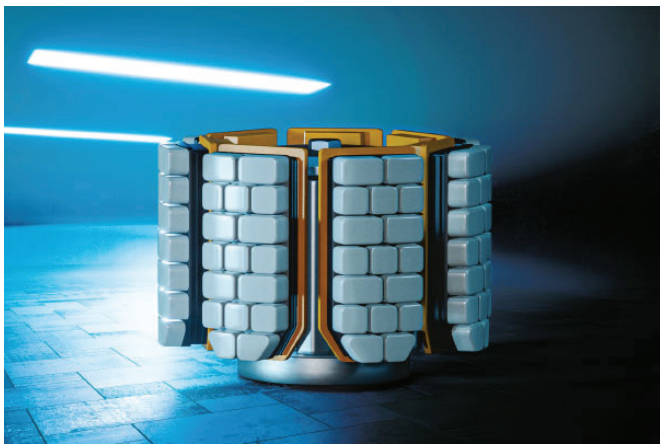
There are several strengths points of the ORBITER, which make it the only real innovation in the sector in the last 10 years. We list the most important ones below:

CUTTING POWER: + 250% COMPARED TO A FICKERT HEAD

The tangential speed of the tool is about 27 m/s compared to less than 11 m/s of a standard Fickert head and therefore the removal capacity is 2.5 times higher.

HIGH PRODUCTIVITY AND DURABILITY

Each tool has 2.5 times the cutting capacity and each head is equipped with 35 tools, so we can increase line speed and have much rarer tool changes, consequently the productivity is much higher.



PROCESSING QUALITY AND UNIFORMITY AT THE HIGHEST LEVELS

Each of the 5 cylinders composing ORBITER, describes a circular motion around its axis that allows the tools to perfectly follow the surface, thus obtaining a uniformity never achieved before and an unparalleled polish.

Thanks to the combination of the motions: rotation of the whole system with the rotation of the cylinder we obtain a multitude of signs, intertwined with each other, about 8 mm. long, thus the concentric “progress mark” typical of the Fickert head is definitively eliminated.

Furthermore, thanks to the 2.5 times higher cutting capacity, finer-grained tools can be used, further improving the quality of the polish even in the absence of treatments.

VERSATILITY

By varying the type and stiffness of the tool, it is possible to full lappato polish, calibrating or following the surface, to smooth the ridges, to satin or to brush the surfaces of slabs and tiles starting from the format of 600 mm. we can carry out very different processes like with the Fickert head.

EASY TO USE

Quick assembly and fewer tool changes mean less effort for the operator, moreover the ORBITER does not require special adjustments, as it easily adapts to different types of machining and uses standard Fickert tools.

FASTDRY: THE FIRST THERMAL MACHINE FROM SYSTEM CERAMICS

System Ceramics is entering the thermal machine sector with the launch of its first high-performance horizontal multichannel dryer.

After achieving a high level of technological excellence in the pressing, decoration and quality control sectors, System Ceramics (Coesia Group) is now expanding its range of activities to the field of thermal machines with the immediate aim of delivering an advanced, high-performance solution. Fastdry is the first horizontal multichannel dryer developed by the Fiorano Modenese-based company as part of an integrated vision aimed at optimising the complete ceramic production process.

Technical characteristics

The Fastdry dryer is designed with independent chambers equipped with air intake and blowing boxes, a solution that guarantees optimal airflow control and consequently uniform drying over the entire surface of the tile or slab. The box system for air distribution not only separates the various levels but also serves to transfer the ingoing and outgoing air volumes. Each box has a number of independent channels into which the air can be introduced, thereby controlling its flow and guaranteeing uniform drying.

As part of the horizontal dryer category, Fastdry offers numerous advantages. Along with the ability to regulate airflows and ensure a high level of control and stability and consequently optimal drying quality and consumption, Fastdry also has the necessary versatility to meet market demand for flexibility. The separation into layers enables it to handle products with different drying times. A further contribution in terms of flexibility comes from the software developed by the System Ceramics engineering team, which allows for the management and traceability of multiple products inside the machine.

Fastdry's quality can be further improved by installing a high-speed rapid outfeed module capable of handling tiles or slabs with thicknesses from 3 to 30 mm while ensuring uniform temperature values over the products' entire length. The uniformity of the drying cycle also brings a number of benefits when the ink is applied to the substrate: no structural differences between the tiles, a reduction in decoration issues and differences in tone, as well as an increase in productivity when applying effects.

Maintenance

Fastdry has limited maintenance requirements. Inspection and routine cleaning can be performed rapidly and efficiently thanks to the lateral access to each level. This results in ease of use as well as reduced maintenance costs, confirming the effectiveness of a design approach that focuses on optimising management.

An interconnected and digitalised process

Like all System Ceramics' latest-generation technologies, Fastdry is also interconnected and digitalised. The new dryer's entire process can be integrated with Prime, the software services platform designed and built in-house to organise the information flows of entire production facilities. This highly integrated and connected system has a simple and user-friendly human-machine interface (HMI) for total control of Fastdry's activities, while embracing the principles of sustainability and the circular economy.

Fastdry therefore integrates perfectly with the evolution of Superfast in terms of both design and process, creating an integrated system capable of increasing the speed and flexibility of all steps in ceramic tile production. This customer-oriented design process focuses on the ability to provide personalised solutions to any requirement and to produce high-quality ceramic products.

RAK Ceramics completes its large-format output capacity in the UAE together with SACMI

A new investment for RAK Ceramics' Ras Al Khaimah production complex (MC2 unit). The company has gone for two PH8200 presses complete with moulds, the world-beating SACMI solution that provides unmatched process performance, quality and repeatability with large formats

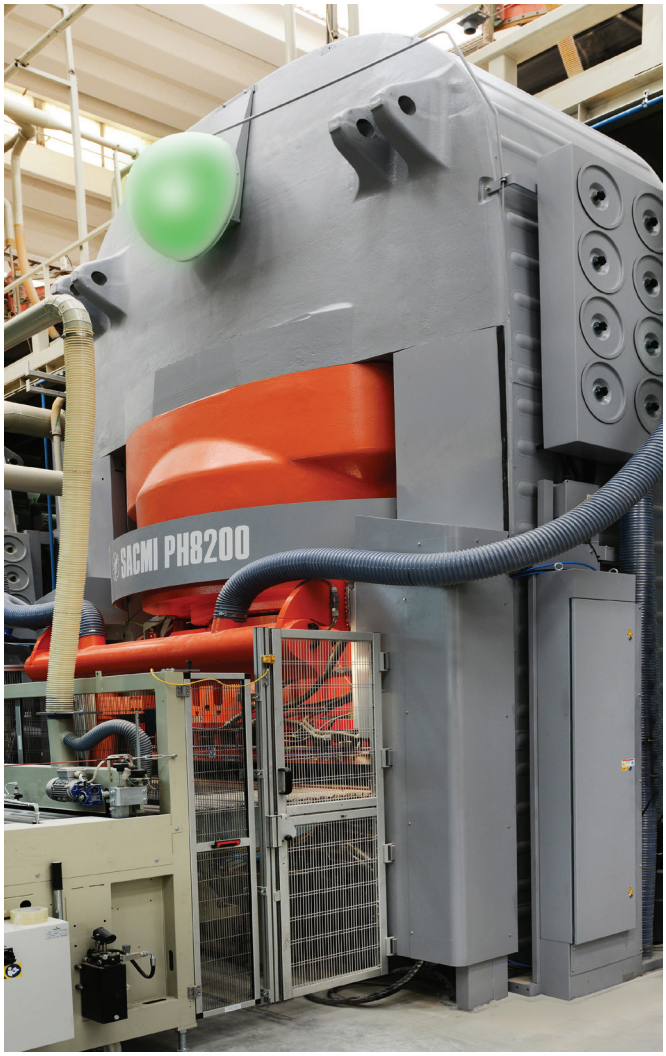
RAK Ceramics (UAE) has given its MC2 plant a boost with SACMI pressing technology to create a medium-large glazed porcelain stoneware line for items measuring from 60x60 to 120x120 cm (and relative sub-sizes), plus slabs as large as 100x100 and 90x180 cm.

Two SACMI PH8200 presses complete with moulds will be shipped by the end of the summer. They'll provide a high-tonnage solution that combines the best-known features of the series - reliability, outstanding productivity, optimised consumption and power - with maximum process precision and repeatability, just perfect for handling such large sizes.

The advanced digital controls on the PH8200 provide efficiency levels unattainable on a conventional high-tonnage press. Moreover, the SPE proportional electronic ejector - a SACMI exclusive - allows trouble-free ejection of even the biggest slabs by maximising performance and repeatability.

These characteristics, which have made the press an international success, have also attracted the attention of RAK, who selected it for their ambitious MC2 revamp project. Furthermore, this investment sees the multinational ceramic floor-wall tile and bathroom furnishings company complete its large-format output capacity.

This latest solution, located in the Ras Al Khaimah production complex, will be the second line that RAK has installed in the Emirates to make such type of tile size; it follows an investment in a SACMI Continua+ line, which has been operating successfully at the company's main plant for years.



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Global concrete business

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16th Global CemFuels Conference & Exhibition Alternative Fuels for Cement and Lime

20 - 21 September 2023

Venue: Istanbul, Türkiye

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Tel.: +44 1372 743837 Fax: +44 1372 743838
Email: rob@propubs.com
www.CemFuels.com

1st Global ConChems Conference & Exhibition on construction chemicals 2023

11 - 12 October 2023

Venue: Brussels, Belgium

For more information, please contact:
Dr. Robert McCaffrey
Tel.: +44 1372 743837 Fax: +44 1372 743838
Email: rob@propubs.com
www.GlobalConChems.com

XXV International Construction Forum | Cement Concrete - Dry Mixtures

18 - 20 October 2023

Venue: Expocentre, Moscow, Russia

For more information, please contact:
Tel.: +7 812 3350992
Email: info@alitinform.ru
Website: http://www.infocem.info

25 ANNIVERSARY

XXV INTERNATIONAL CONSTRUCTION FORUM

CEMENT · CONCRETE DRY MIXTURES

OCTOBER 18 - 20, 2023. EXPOCENTRE, MOSCOW.

CEMENT·CONCRETE DRY MIXTURES

XXV INTERNATIONAL CONSTRUCTION EXHIBITION
«Cement. Concrete. Dry mixtures»

ConTech International Conference
«Concrete Technologies: Chemistry, Production, Precast»

MixBuild International Scientific and Technical Conference **«Modern Technologies of Dry Mixtures in Construction»**

- More than 6000 exhibition visitors
- 450 members of the business program
- 150 exhibits
- 80 reports
- 18 countries

ALITINFORM · Российский Союз Строителей — organizers

ЭКСПОЦЕНТР МОСКВА — venue

info@alitinform.ru // www.infocem.info //+7 812 335 09 92

16th Global Insulation Conference - insulation trends and technology

31 October-1 November 2023

Venue: Chicago, USA

For more information, please contact:
Dr. Robert McCaffrey
Tel.: +44 1372 743837 Fax: +44 1372 743838
Email: rob@propubs.com
www.globalinsulation.com

7th Virtual Global CemProducer Seminar - cement production optimisation

9 November 2023

Venue: Your device

For more information, please contact:
Dr. Robert McCaffrey
Tel.: +44 1372 743837 Fax: +44 1372 743838
Email: rob@propubs.com

4th Global FutureCem Conference & Exhibition - low CO_2 options for cement and concrete

November 2023

Venue: TBC

For more information, please contact:
Dr. Robert McCaffrey, Global FutureCem Conference convenor
Tel.: +44 1372 743837 Fax: +44 1372 743838
Email: rob@propubs.com

3rd Virtual Global CemPower Seminar - Electrical generation and efficiency

28 November 2023 at 10:00 - 17:00 Central European Time (Berlin, Paris, Rome)

Venue: Your device

Free registration link: https://attendee.gotowebinar.com/register/4832835609615416590
For more information, please contact:
Dr. Robert McCaffrey
Tel.: +44 1372 743837 Fax: +44 1372 743838
Email: rob@propubs.com
https://www.globalcement.com/conferences/more/global-cempower

5th Conference and 1st Exhibition of Cement Industry and Technology 2023

30 November - 02 December 2023

Venue: Damascus Fairground, Damascus, Syria

For more information, please contact:
Mobile/WhatsApp: +963969019984
E-mail: info@cementtechco.net
Website: www.cementtechco.net

3rd Virtual European Cement Conference - Market trends and technology in Europe

5th December 2023 at 10:00 - 17:00 Central European Time (Berlin, Paris, Rome)

Venue: Your device

For more information, please contact:
Dr. Robert McCaffrey
Tel.: +44 1372 743837 Fax: +44 1372 743838
Email: rob@propubs.com
https://globalcement.com/conferences/more/european-cement/virtual

4th Virtual Global Ash - Ash for cement and concrete

12th December 2023

Venue: Your device

For more information, please contact:
Dr. Robert McCaffrey
Tel.: +44 1372 743837 Fax: +44 1372 743838
Email: rob@propubs.com
For more information, please visit:
www.GlobalCement.com

66th IEEE-IAS/PCA Cement Industry Technical Conference

05 - 09 May 2024

Venue: Gaylord Rockies, Denver, USA

For more information, please visit:
https://cementconference.org

Cement Factory Maintenance (6-Week Online Training)

10th April 2023
10th July 2023
09th October 2023

Venue: Your Device

Email: Training@CemNet.com
For more information, please visit:
www.CemNet.com

Cement Kiln Process Chemistry (6-Week Online Training)

03rd April 2023
03rd July 2023
02nd October 2023

Venue: Your Device

Email: Training@CemNet.com
For more information, please visit:
www.CemNet.com

Cement Manufacturing Technology (6-Week Online Training)

03rd April 2023
03rd July 2023
02nd October 2023

Venue: Your Device

Email: Training@CemNet.com
For more information, please visit:
www.CemNet.com

Cement Kiln Refractories (6-Week Online Training)

17th April 2023
10th July 2023

Venue: Your Device

Email: Training@CemNet.com
For more information, please visit:
www.CemNet.com

Grinding and Milling Systems (6-Week Online Training)

17th April 2023
31st July 2023
09th October 2023

Venue: Your Device

Email: Training@CemNet.com
For more information, please visit:
www.CemNet.com

Decarbonizing Cement Manufacture (6-Week Online Training)

10th April 2023
10th July 2023
09th October 2023

Venue: Your Device

Email: Training@CemNet.com
For more information, please visit:
www.CemNet.com

Cement Kiln Pyroprocessing (6-Week Online Training)

10th April 2023
10th July 2023
09th October 2023

Venue: Your Device

Email: Training@CemNet.com
For more information, please visit:
www.CemNet.com

Cement Factory Quality Control (6-Week Online Training)

23rd January 2023
10th April 2023
31st July 2023
30th October 2023

Venue: Your Device

Email: Training@CemNet.com
For more information, please visit:
www.CemNet.com

White Cement Manufacturing Technology (6-Week Online Training)

20th February 2023
04th September 2023

Venue: Your Device

Email: Training@CemNet.com
For more information, please visit:
www.CemNet.com

Uniceramics Products Expo 2023

15th - 19th April 2023

Venue: Foshan, China

Tel: +86 18566021320
For more information, please contact:
Email: eva_chan@uniceramics.com.cn
Website: www.uniceramicsexpo.com

Uniceramics Technology Expo 2023

30th May - 02nd June 2023

Venue: Foshan, China

Tel: +86 18566021320
For more information, please contact:
Email: eva_chan@uniceramics.com.cn
Website: www.uniceramicsexpo.com

DEBURRINGEXPO 2023

10 - 12 October 2023

Venue: Messe Karlsruhe, Germany

For more information, please visit
www.deburring-expo.de/en

CERAMICS CHINA 2023

19 - 22 June 2023

Venue: Canton Fair Complex, Guangzhou, China

For more information, please visit:
http://en.ceramicschina.com.cn

ACHEMA 2024

10 - 24 June 2024

Venue: Frankfurt, Germany

For more information, please visit:
www.achema.de

5th International Underground Excavations Symposium UYAK2023 Istanbul Cities of the Future, Urban Tunnelling, and Underground Excavations

05 - 07 June 2023

Venue: Hilton Istanbul Bosphorus Convention Center, Istanbul, Turkey

Tel: +90 312 4251080
Email: uyak@uyak.org.tr
For more information, please visit:
https://www.uyak.org.tr/en/

BIG 3G EXHIBITIONS 15th Annual Building & Construction Exhibition 15th Annual Home Interiors, Decoration and Furnishing 15th Annual Property and Real Estate Development

12 - 14 March 2023

Venue: New Exhibition World Bahrain, Manama, Bahrain

For more information, please contact:
Mr. Samer Al–Khaldi, Sales Manager – Saudi Office – Al Khobar
Mobile: +966 50 585 1383
Email: s.alkhaldi@tradearabia.net
Website: www.alhilalgroup.com , hilalce.com

Moving towards Net Zero Construction

15 - 16 March 2023

Venue: Hotel Fort Canning, Singapore

For more information, please contact:
John Karras
Tel.: +603 2775 0067
Email: johnk@trueventus.com

European Coatings Show

28 - 30 March 2023

Venue: Nürnberg, Germany

For more information, please visit:
https://www.european-coatings-show.com/

Solids Dortmund

29 – 30 March 2023

Venue: Dortmund, Germany

For more information, please visit:
www.solids-dortmund.de

High-Rises & Vertical Construction Summit

03 - 04 May 2023

Venue: Lindner Hotel & Residence Main Plaza, Frankfurt, Germany

For more information, please contact:
John Karras
Tel.: +603 2775 0067
Email: johnk@trueventus.com

interpack Düsseldorf

04 - 10 May 2023

Venue: Düsseldorf Trade Fair Centre, Germany

For more information, please visit:
www.interpack.com

13th ERBIL BUILD EXPO 13th Erbil International Building & Construction Municipality Equipment & Machinery Exhibition

23 - 26 May 2023

Venue: Erbil International Fair Ground, Iraq

For more information, please contact:
International Sales & Marketing,
tel.: +90 216 575 2828
Email: info@pyramidsfair.com
filiz.karakul@pyramidsfair.com
www.pyramidsfair.com

SOLIDS Parma

14 - 15 June 2023

Venue: Fiere di Parma, Italy

For more information, please visit:
https://www.solids-parma.de/en/

4th Annual BIM Summit

14 - 15 June 2023

Venue: The Berkeley Hotel Pratunam, Bangkok, Thailand

For more information, please contact:
Mr. John Karras
Tel.: +603 2775 0067
Email: johnk@trueventus.com

11th Annual Modular, Prefab & Construction Tech

14 - 15 June 2023

Venue: The Berkeley Hotel Pratunam, Bangkok, Thailand

For more information, please contact:
Mr. John Karras
Tel.: +603 2775 0067
Email: johnk@trueventus.com

Maintenance and Reliability 4.0

05 - 06 July 2023

Venue: Bangkok, Thailand

For more information, please contact:
Mr. John Karras
Tel.: +603 2775 0067
Email: johnk@trueventus.com

Powtech 2023

26 - 28 September 2023

Venue: Nürnberg, Germany

For more information, please visit:
www.powtech.de/en

SOLIDS Rotterdam

04 - 05 October 2023

Venue: Rotterdam, the Netherlands

For more information, please visit:
www.solidsrotterdam.nl/en/edition/solids-rotterdam-2023

BUILD EXPO Egypt 4th Cairo International Building, Construction, Energy, Electricity Municipal Equipment Exhibition

26 - 28 October 2023

Venue: Cairo International Conference Center, CICC, Egypt

For more information, please contact:
International Sales & Marketing, tel.: +90 216 575 2828
Email: info@pyramidsfair.com
filiz.karakul@pyramidsfair.com
www.pyramidsfair.com

Concrete future - net zero transition

Dr Andrew Minson DPhil (Oxon) CEng FIStructE FICE
Concrete and Sustainable Construction Director, Global Cement and Concrete Association (GCCA)
United Kingdom

Abstract

The Global Cement and Concrete Association was founded by the cement industry around the world to be the voice of the global industry: it advances sustainability and fosters innovation to support decarbonisation. To achieve this, GCCA's activities include advocacy at the highest levels through the United Nations and global bodies such as the World Economic Forum. GCCA also delivers on a sustainability charter to which all members commit, operates two innovation platforms under the Innovandi name, has a global transparent reporting system GNR, and provides the industry with an Environmental Product Declaration Tool.

A key part of our messaging is the positive contribution our material makes to society. Analysis of the targets underpinning the United Nations Sustainable Development Goals and the contribution of concrete concludes that almost half the targets are directly influenced in a positive way by concrete. A reason for this is that the material has the attributes and versatility to enable designers to deliver sustainable and durable projects. However, GCCA and its members do recognise that there is a challenge of the CO_2 production impacts and action on these has commenced.

The GCCA has launched a net zero concrete roadmap in 2021 to demonstrate how this challenge can be met with action by the industry, action along the value chain and action from policy makers and governments. To build on the global roadmap, a programme to accelerate national decarbonisation was launched in March 2022. In this programme, Phase 1 countries are Thailand, India, Egypt and Colombia. Phase 2 countries, which will include Brazil, will be announced in early 2023. In each country a pathway or roadmap is developed to net zero concrete by 2050 with 2030 milestones. In addition, the key policy asks are identified and there is engagement with the policy makers. Finally, lighthouse projects are identified to demonstrate action.

1-Introduction

It is a great pleasure to speak at the 25th Arab International Cement Conference and Exhibition. In my presentation on Net Zero Transition, I firstly explain the benefits of the built environment through the prism of the UN Sustainable Development Goals; and, then focus on whole life CO_2 emission impacts of construction. This is the important context for the GCCA net zero concrete global roadmap and national net zero accelerators which will provide a framework, catalyst and monitoring for our industry's net zero transition. I will then finish by explaining other GCCA activity and how this helps members and conveys the key messages of our industry.

2-Introduction To Global Cement And Concrete Association

The Global Cement and Concrete Association was launched in 2018 and our member companies operate in almost every country of the world. The GCCA is a CEO led organisation. Our members are producers of Portland cement clinker and other natural cementitious clinkers used in the manufacture of cement around the globe. The GCCA also has more than 25 affiliate members - partner national and regional industry associations. The latest listing of our members and affiliates is available at www.gccassociation.org .

The mission of GCCA, which I am sure many at this AICCE25 conference will be able to share is “Together, we are committed to building a bright, resilient and sustainable concrete future for our industry and for the world”.

The purpose of GCCA is to advance sustainability of cement and concrete and a key part of this is to foster innovation to support decarbonisation of the industry thereby supporting the net zero transition.

3-Benefits and impacts of the built environment

3.1 Benefits: The UN Sustainable Development Goals

The UN Sustainable Development Goals (SDGs) [1] provide a useful tool to measure the benefits of the built environment. To enable countries, companies and organisations to report progress through to 2030 on the UN SDGs, there are 169 specific targets underlying the 17 goals. To ascertain the influence of infrastructure (defined as buildings as well as civil engineering works) in achieving the goals, United Nations Office for Project Services (UNOPS) commissioned a study that investigated the direct and indirect influence of infrastructure in achieving the 169 targets.

Thacker (2018) [2] reports that:

- Infrastructure either directly or indirectly influences:
  - All 17 of the SDGs
  - 121 of the 161 targets (72%)
- For 5 of the 17 SDGs (SDG 3, 6, 7, 9 and 11), all these targets are influenced by infrastructure
- For 15 of the SDGs, more than half of the targets are influenced by infrastructure

Specific examples of how infrastructure benefits society are the following targets that are directly positively influenced by infrastructure:

- SDG Target 3.8: Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all
- SDG Target 4.1: By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes
- SDG Target 11.1: By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums

The study by Thacker prompted the question: What role does concrete have in contributing to the UN SDGs. A study by Minson [2020] adopted the same methodology as Thacker [2018]. The conclusion is shown in figure 1 below:

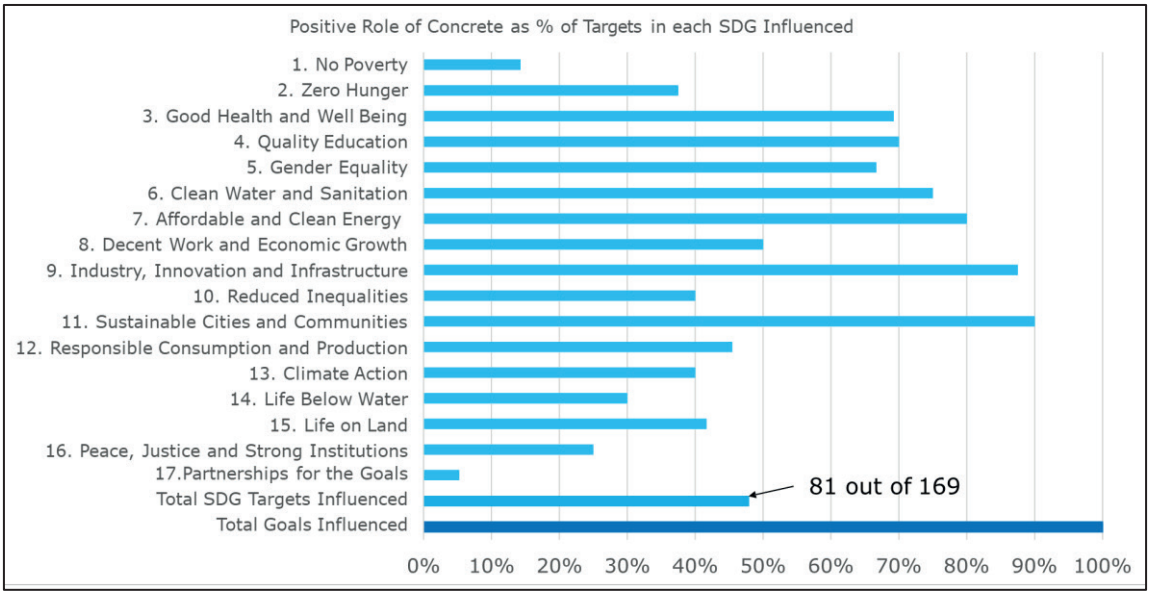

Figure 1: Positive Role of Concrete on UN SDGs [3]

3.2 Impacts

Building construction (including materials) and operations (or "use") are responsible for 39% of the Global CO_2 Emissions: a total of 14 Gt/a. These can be seen as exploded pieces from the pie chart in Figure 2.

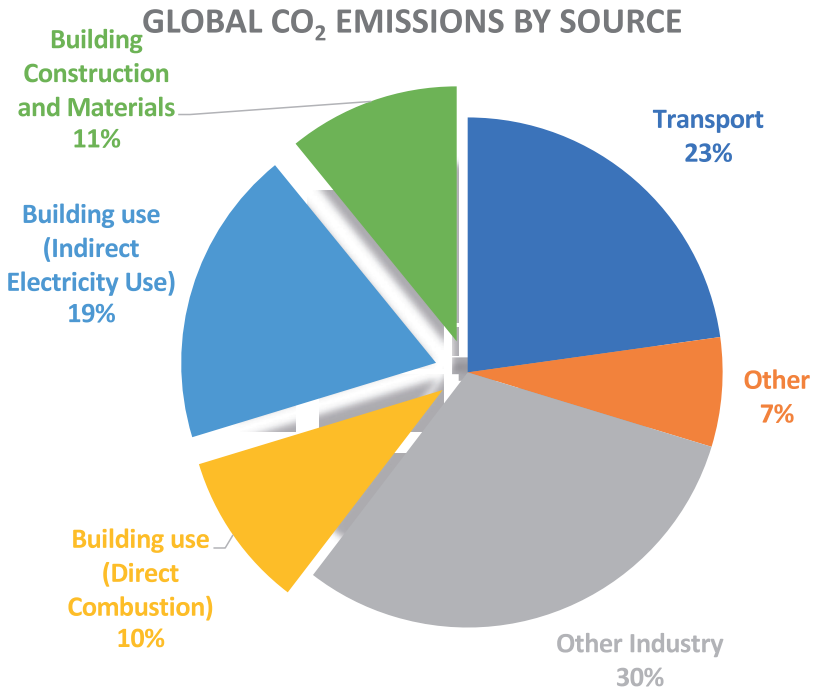

Figure 2 – Global CO_2 Emissions by Source [4]

The challenge for all in the built environment is to minimise the impacts and maximise the benefits.

4-Net zero roadmap for cement and concrete

4.1 Global Roadmap

The GCCA 2050 Cement and Concrete Industry Roadmap for Net Zero Concrete [6] is the collective commitment of the world's leading cement and concrete companies to fully contribute to building the sustainable world of tomorrow.

Our roadmap sets out a net zero pathway to help limit global warming to 1.5ºC. The sector is committed to producing net zero concrete by 2050 and is committed to acting now.

The industry has already made progress with proportionate reductions of CO_2 emissions in cement production of 20% over the last three decades. The roadmap highlights a significant acceleration of decarbonisation measures achieving the same reduction in only a decade. It outlines a proportionate reduction in CO_2 emissions of 25% associated with concrete by 2030 from today (2020) as a key milestone on the way to achieving full decarbonisation by mid-century.

Our roadmap represents a decisive moment for our industry and the world, demonstrating that it is possible, and setting out an achievable net zero pathway for the world's most used human-made material. GCCA members pledge to achieve the roadmap aims, contributing in line with their position in the cement and concrete value chain.

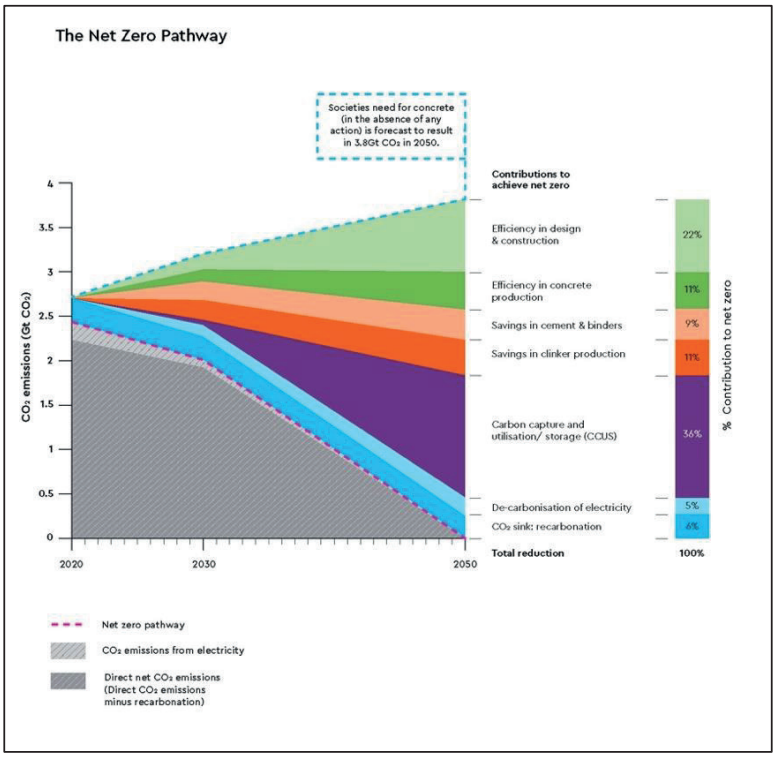

Figure 2 – The Net Zero Pathway for Concrete to 2050 [6]

The roadmap sets out the levers and milestones needed to achieve net zero across the whole lifecycle from cradle to cradle. It highlights the actions from the industry already underway and those it will undertake in the months and years ahead, as well as the important contributions from designers, contractors, developers, and clients in the use of concrete in the built environment, and those from policymakers.

We will succeed with the right policies in place to shape demand for low carbon products (economic viability), enabling a transition of the sector and making full use of circular (economy) opportunities, as well as supporting the development and implementation of innovations and key infrastructure.

The roadmap outlines this collective endeavour and our 'Concrete Future' which will guide us to a net zero future for society's critical building material and for the world.

4.2 National Roadmaps

Following the launch of the GCCA Concrete Future Net Zero Roadmap in October 2021, the GCCA team and its members recognised the need to complement our Net Zero global commitment with a clear delivery and accountability programme to ensure implementation of local Net Zero actions. The "Roadmap Net Zero Accelerator" initiative was launched at UNFCCC MENA Climate Week in March 2022.

The initiative has three focus areas: 1) Roadmap, 2) Policy Action Agendas, and 3) Leadership Activation.

The Net Zero Accelerators support and deliver national roadmaps in line with the global roadmap (net zero by 2050, 2030 milestones and whole value chain), activate decarbonisation levers locally, achieve policy change through collaboration with governments and deliver lighthouse projects. There is a focus on key countries in the Global South.

Phase 1 countries announced in March 2022 are Colombia, Egypt, India, and Thailand, and the last of these launched their national roadmap at COP27 in November 2022. A further tranche of Phase 2 countries will be announced in early 2023 and will include Brazil.

5 GCCA activity

5.1 Seat at top table

A key role of GCCA is to represent the cement and concrete industry at global level. Some examples are provided.

GCCA has done work alongside the United Nations Secretary General, who welcomed the launch of our Net Zero Concrete Roadmap and called on all cement companies to join us. GCCA is the first industry association to partner with the UN Race to Zero as an accelerator. GCCA has the official observer status at the UN Climate COP, where we run a programme of engagements.

GCCA was welcomed by the US Climate Secretary John Kerry as a 'knowledge partner' in the First Mover Coalition. We are one of just two industry associations to have strategic collaboration with the Clean Energy Ministerial on CCUS, which is an initiative of the world's key economies at a governmental level.

Finally, GCCA collaborates with the World Economic Forum in the cement/ concrete initiative under the Mission Possible Partnership initiative.

5.2 GCCA Global Innovation platforms

GCCA has two innovation platforms that are addressing the CO_2 footprint of cement and concrete.

The Innovandi Global Cement and Concrete Research Network (GCCRN) undertakes pre-competitive research. The Innovandi GCCRN is made up of a consortium of 75 partners: 33 of which are industrial partners, and 42 academic partner institutions from around the globe.

There are currently over 50 Innovandi GCCRN projects underway, with the following project themes:
- Energy efficiency
- Efficiency of clinker production including alternative calcination technologies enabling implementation of CCUS/ technologies
- Understanding impact of new materials
- Low carbon concrete technology
- Concrete recycling

The Innovandi Open Challenge connects start-ups with industry. The purpose behind this is to identify new technologies and establish agreements between start-ups and consortia of companies. It is open to anyone to submit projects, and all GCCA members.

The First Open Challenge call was on:
- Calcination technologies
- Carbon capture technologies
- Carbon use in the construction supply chain
- Improved recycling of concrete

Six consortia of GCCA members supported the following start-ups as a result of the first call in the Innovandi Open Challenge:
- CarbonOrO
- Carbon Upcycling Technologies
- Coomtech
- Fortera
- MOF Technologies
- Saipem

A second Open Challenge will be announced in Q1 2023.

5.3 Environmental Product Declarations

As a reminder to those who are less familiar with Environmental Product Declarations (EPD):

- Environmental Product Declarations (EPDs) are the environmental equivalent on construction products of “nutrition labels” on food
- Intention is that EPDs are used by engineers, architects, developers, and clients to compare products that have functional equivalence and to pass environmental information down the value chain
- GWP (carbon footprint) is one of the indicators on an EPD
- EPDs are increasingly demanded in Nth America and Europe
- Widespread demand for EPDs is expected to follow throughout world
- How EPDs are produced is defined by standards

The GCCA has a software EPD Tool for Clinker, Cement and Concrete (RMX and Precast). This tool:

- Speeds up the production of an EPD and is externally recognized by EPD International as a pre-verified tool
- Widely used by members in Europe and Nth America
- Ensures favourable application of the EPD standards (e.g., recarbonation)
- Enables industry to have:
  - Consistent EPDs
  - Cost effective EPDs

GCCA is encouraging the use of this tool in academic research so that comparisons can be consistent.

6-Conclusion

GCCA is delighted to work with members and cement associations (both country and regional) from around the world in pursuing our respective purposes.

It is through collaboration amongst the whole cement and concrete global family, that we will achieve our mission.

References:

1. UN (2015). Take action for the sustainable development goals - United Nations sustainable development. [online] Available at: https://www.un.org/sustainabledevelopment/sustainable-development-goals/. [Accessed 24 May 2022].

2. Thacker, S., Kelly, S., Pant, R. and Hall, J. W. (2018). Evaluating the benefits of adaptation of critical infrastructures to hydrometeorological risks. Risk Analysis, 38: 134–150.

3. Minson, A. (2020). The United Nations Sustainability Development Goals and Concrete. fib Symposium 2020.

4. International Energy Agency. (2019). Global Status Report for Buildings and Construction: Towards a Zero-Emission, Efficient and Resilient Buildings and Construction Sector

5. Balfour Beatty. (2017), “Innovation 2050”

6. Global Cement and Concrete Association. (2021), Concrete Future: The GCCA 2050 Cement and Concrete Industry Roadmap for Net Zero Concrete

Decarbonization and emission reduction with state-of-the-art cement plant equipment

By: Andreas Hand // Humboldt Wedag GmbH, Germany

Sustainability is the essential focus of technological development in the cement industry at the moment. As is well known, the cement industry is responsible for about 7% of CO_2 emissions worldwide and is the third largest industrial consumer of energy. To reduce the industry's environmental footprint, it is therefore vital to reduce thermal and electrical energy consumption and increase the use of alternative fuels and raw materials (AFR).

As one of the leading technology providers worldwide, KHD is committed to innovating for sustainable growth. Supporting various initiatives on the low-carbon roadmap, the company has further expanded its portfolio of best available technologies to deliver lower energy consumption and maximize AFR utilization.

For example, to enable the use of various lumpy alternative fuels (AF), KHD has successfully introduced the Pyrorotor® combustion chamber to market. The Pyrorotor is suitable for almost all types of AF currently in use at cement plants. Its key feature is its flexibility to burn whatever fuel is available locally, with minimal pre-processing, including coarse AF, low-processed refuse-derived fuels (RDF), and whole tires, etc. This results in significant cost reductions in fuel preparation and utilization.

To meet the global NO_x emission guidelines, KHD has developed the Pyroredox® gasifying reactor. Installed between the calciner and kiln inlet, this state-of-the-art system significantly reduces NO_x emissions at source, and so minimizes the need for secondary emission control technologies to meet NO_x emission limit.

Both Pyrorotor and Pyroredox systems are suitable for installation in retrofit projects without greatly influencing the existing plant layout. The remainder of this article will discuss these technologies in more detail.

Co-processing technologies

The technical development of combustion equipment for AF in a modern kiln line has progressed so far that thermal substitution rates (TSR) of up to 95% have become possible. This includes suitable kiln burners, such as the Pyrojet® from KHD, which incorporates special features for AF firing, as well as options for additional O_2 or H_2 enrichment.

The calciner offers greater potential for AF combustion than the kiln, particularly for inferior and coarser fuels. For this purpose, KHD developed the Pyroclon® calciners, with additional modules that enable the use of a wide range of AF with decreasing processing requirements.

Figure 1 shows a simplified classification of requirements of typical AFR for use in the kiln burner and calciner applications.

	Pyrojet® Kiln Burner	Pyroclon® R Calciner	Pyroclon® R with **Pyroincinerator**	Pyroclon® R with **Combustion Chamber**	Pyroclon® R with **Pyrorotor®**
	Pre-processing demand				**Usable particle size**
Waste oil / Animal meal / Sewage sludge	✓	✓	✓	✓	✓
Biomass	max. 2×1×1 mm (3D)	max. 5×5×2 mm (3D)	max. 20×20×5 mm (3D)	max. 40×40×10 mm (3D)	max. 100×100×15 mm (3D)
Plastics	max. 2×1×1 mm (3D)	max. 5×5×2 mm (3D)	max. 20×20×5 mm (3D)	max. 40×40×10 mm (3D)	max. 300×100×100 mm (3D)
RDF / Fluff	max. 10×10 mm (2D)	max. 30×30 mm (2D)	max. 70×70 mm (2D)	max. 100×100 mm (2D)	max. 300×300 mm (2D)
Tire Chips	×	max. 40×40×25 mm (3D)	max. 50×50×25 mm (3D)	max. 70×70×25 mm (3D)	max. 300×300×25 mm (3D)
Whole Tires	×	×	×	×	✓

Figure 1: KHD alternative fuel technologies and their capabilities.

KHD Pyrorotor: versatile AFR reactor for high TSR

The Pyrorotor is a rotary combustion reactor that processes waste materials with inferior burning properties in the cement process. Within the range of KHD´s modular co-processing solutions, the Pyrorotor covers demands for the highest TSR of even the least processed AF (Figure 1).

The technology offers a great deal of flexibility in terms of fuel particle sizes and materials that can be processed. Whole tires, tire chips, coarse and lumpy materials, hard-to-ignite materials, and even contaminated and hazardous materials can be fired in the Pyrorotor. The need for complex and expensive pre-processing of these materials can thus be minimized or avoided completely.

The Pyrorotor can be installed in new plants. It can also be retrofitted to existing kiln lines, because it neither requires space in the existing pre-heater tower structure, nor does it add additional load to it.

The mechanical concept behind the Pyrorotor is based on the most robust combustion equipment known and trusted for difficult material properties in the cement industry: the rotary kiln (Figure 2). The rotating drum mixes the fuel particles with hot tertiary air, while long retention times ensure complete burn-out of waste materials. The constant movement of the combustion chamber also avoids build-ups and clogging.

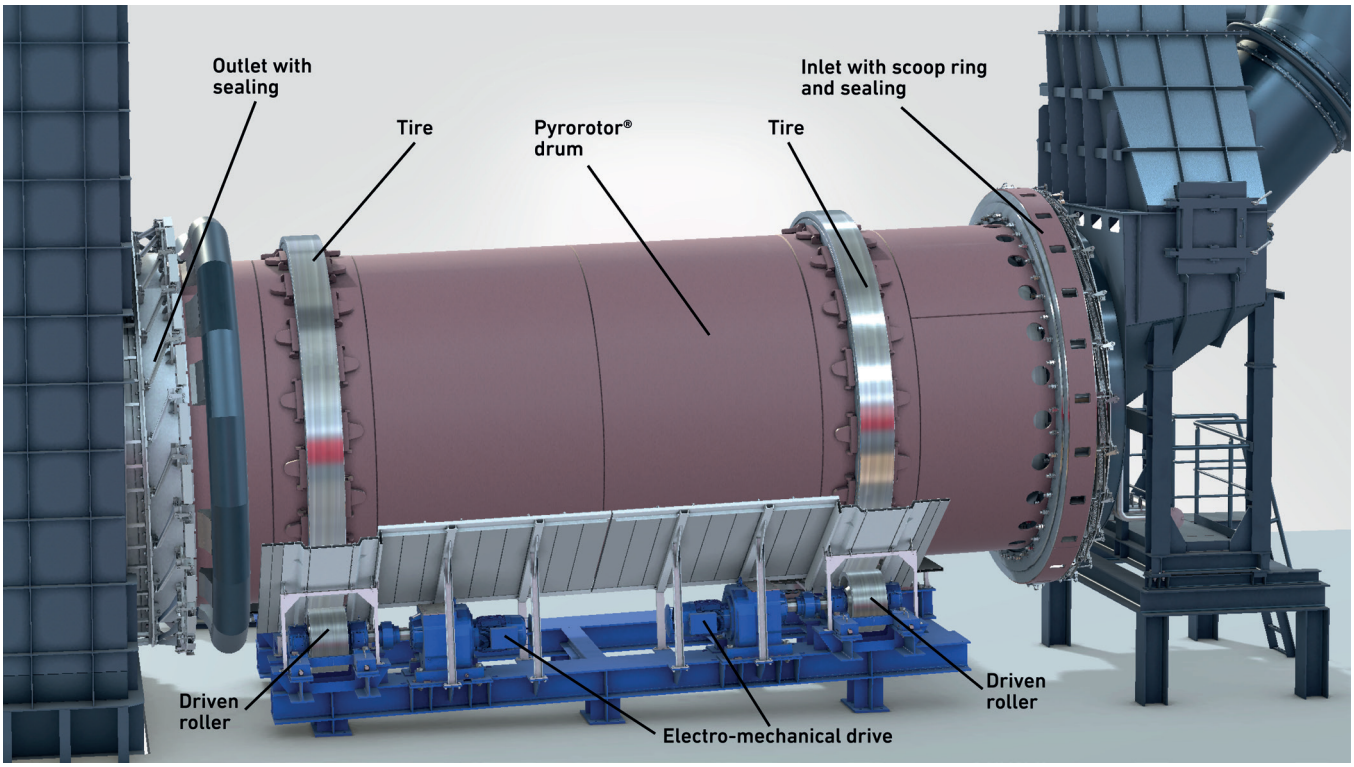

Figure 2: All Pyrorotor components originate in the rotary kiln, where they have demonstrated their reliability and performance for decades.

Fuel is fed into the Pyrorotor via a suitable sluice system, such as rotary air locks or double pendulum flaps, to prevent false air from entering the system.

The rotary combustion chamber is safely supported and balanced on two roller stations. The required torque for rotation is induced by two friction-driven rollers. The installed drives offer a large reserve in terms of the torque that can be provided, ensuring they are able to cope with a wide range of loads and rotation requirements. The rotational speed of the drum can be adjusted, usually in the range of 0.3-3.0 rpm, to adapt fuel retention time to the needs of the specific material.

Figure 3 depicts a flowsheet in which the Pyrorotor is installed between the kiln and the calciner. A controlled portion of tertiary air is branched off to provide the required flow into the Pyrorotor.

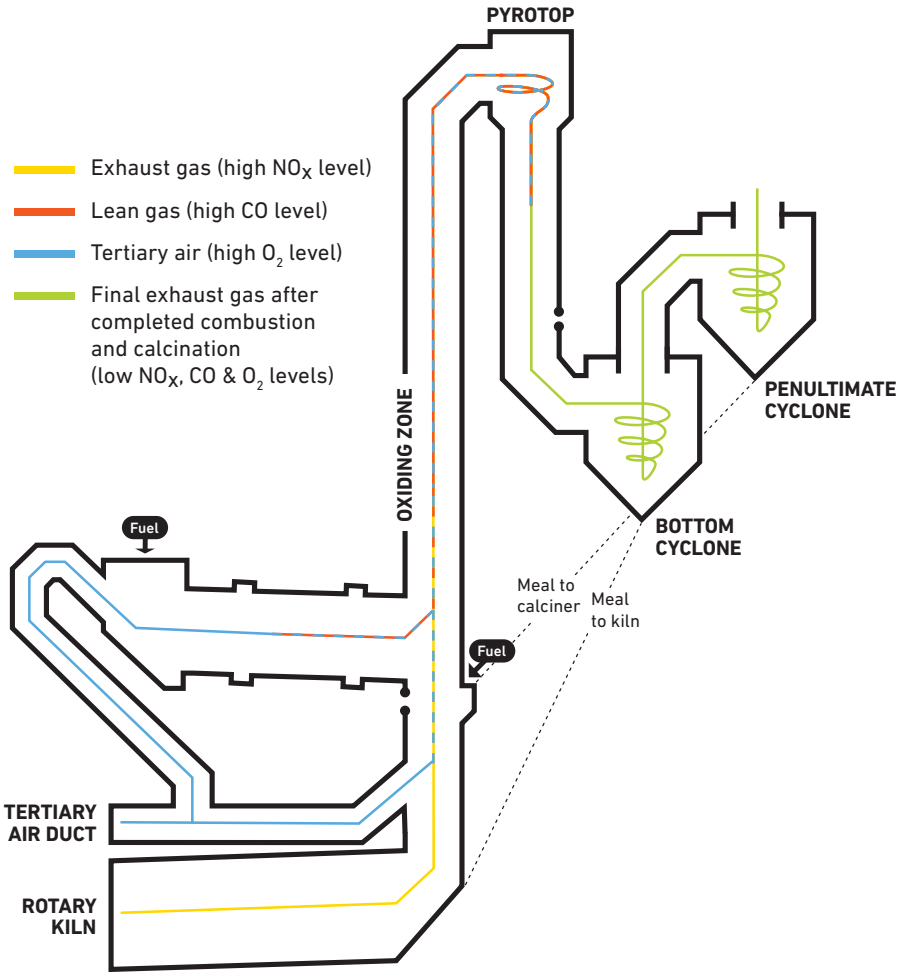

Figure 3: Pyrorotor gas flow scheme.

Depending on the type of fuel and any desirable combustion staging, the Pyrorotor can be operated with varying lambda-levels, so that a pronounced pyrolysis can also be achieved for energy-efficient and emission-optimized combustion. After a beneficially-long retention time inside the Pyrorotor, the ashes are dropped directly into the kiln riser duct, where they form part of the calciner fuel supply and kiln inlet feed. Combustion off-gases and entrained fuel particles leave the Pyrorotor to create a second stage of combustion in the regular calciner. This staged combustion concept facilitates energy efficiency and NO_x reduction.

Industry references

Since its first installation in 2017, 12 Pyrorotors have been sold, of which six are now in operation and six are being executed.

Figure 4 describes an installed Pyrorotor and the achieved operating values. This system utilizes coarse RDF with up to 300 mm edge length in 3D. Achieved TSR of the calciner is 87%.

		Guarantee	Realized
Clinker Production	t/d	5,000	5,058
Heat Consumption	kJ/kg	3,517	3,182
Thermal AF Substitution Rate at Calciner	%	> 85 %	87 %
AF Mass Flow	t/h		20-25 t/h
Physical Properties of Alternative Fuel		3D Material @ 300 mm	3D Material @ 300 mm
AF Heating Value	kJ/kg	>14,650	21,400

Figure 4: Contracted and realized performance data of a Pyrorotor in South Korea.

Figure 5 shows a typical retrofit arrangement into an existing preheater tower. As the Pyrorotor is installed directly above the kiln and, in most cases parallel to it, there is hardly any limitation to retrofits, since it neither requires space in the tower, nor does it greatly increase the load on it. All connections for the tertiary air ducts and the material feeds can be placed without any problems.

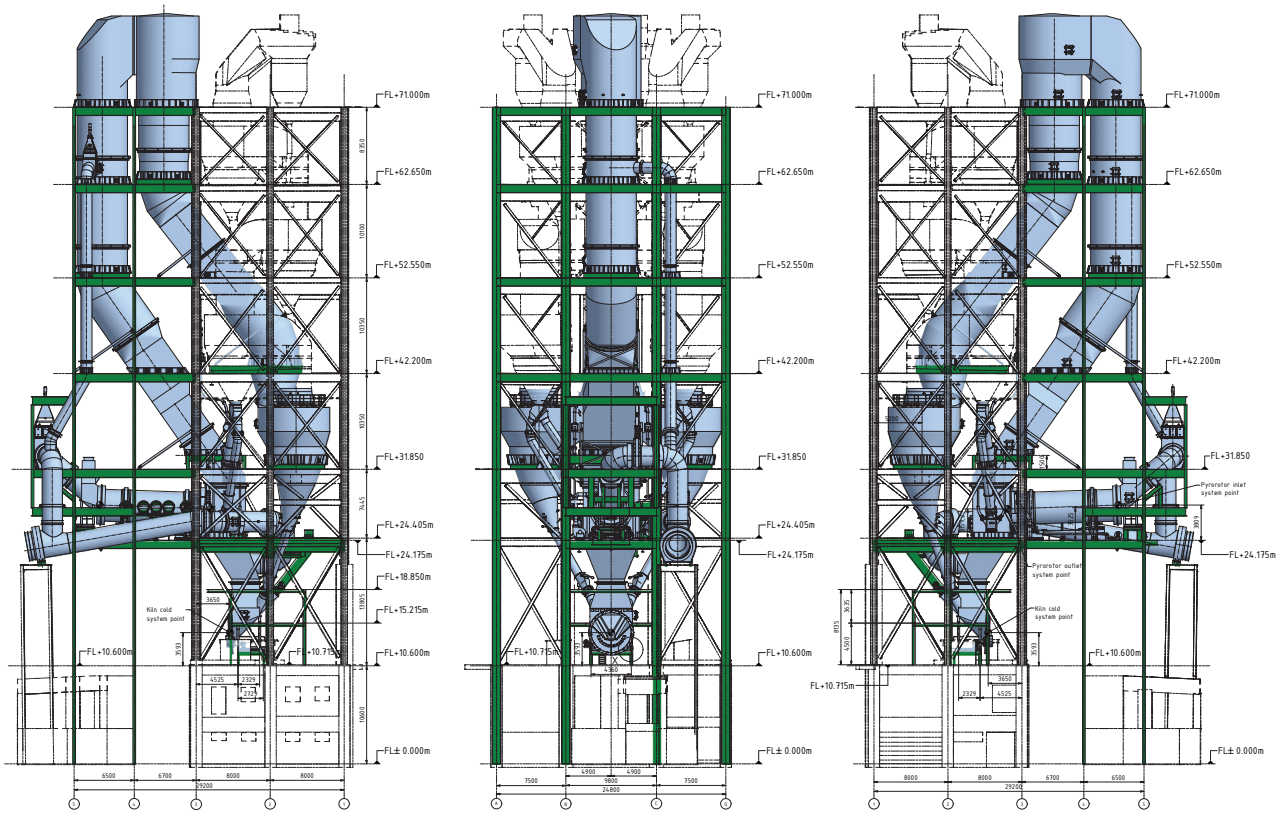

Figure 5: A Pyrorotor retrofit installation.

The Pyrorotor has already been retrofitted to several different types of calciners, from various suppliers. It can also produce an even greater benefit when combined with concurrent modification of the calciner, e.g., an increase in production and a reduction of emissions can be achieved alongside the increased TSR.

Pyroredox: high-efficiency NO_x abatement

Control of emissions – especially NO_x emissions – is becoming increasingly important in clinker production, as emission limits are tightened around the world. Today, staged combustion, SNCR and SCR systems are the standard technical solutions to meet these emission limits.

To optimize abatement efficiency, as well as operational and investment cost, KHD developed the Pyroredox reactor. This additional gasifying reactor is connected between the rotary kiln and calciner, but is operated independently of the calciner.

Due to its modular design, the Pyroredox can be installed not only on new kiln lines, but also during retrofit projects as well. Consequently, the first two installations were realized in PR China to upgrade existing kiln lines from Chinese suppliers.

Pyroredox reactor design criteria

Existing equipment for the primary reduction of NO_x in kiln exhaust gases, such as the KHD Pyroclon R Low NO_x AF calciner, already provided good NO_x reduction levels. However, a stable cement process required a compromise between NO_x conversion and other operational parameters. This compromise limited NO_x reduction potential.

By subdividing the calciner into two separate reactors, one for NO_x conversion (the Pyroredox) and another for calcining, these limits were overcome and the potential of each parameter promoting NO_x conversion in a cement kiln was improved.

The most efficient reduction of NO_x can be achieved in high CO concentrations, together with lowest possible CO_2 partial pressure, and with enough kiln dust to act as a catalyst. Water content in the exhaust gases of the rotary kiln depends primarily on the type of fuel fired at the main burner, and consequently its influence is limited.

To achieve these conditions, the Boudoard Reaction is the key. Due to the lack of oxygen, CO_2 emitted from the rotary kiln is reduced with carbon from the calciner fuel to create CO in the first zone of the reactor. Because this is an endothermic reaction, control of the temperature can be managed by adjusting the oxygen content at kiln inlet and the fuel ratio to the Pyroredox. Meal feed can be limited to the minimum necessary to ensure sufficient catalysis, while avoiding significant release of unwanted CO_2 from calcination of the meal.

During passage through the Pyroredox, NO_x from the rotary kiln is efficiently converted into N_2 under optimized conditions and, at the exit, exhaust gases are merged with tertiary air. CO reacts exothermally with oxygen in the tertiary air to form CO_2, and the heat released calcines the meal in the downstream calciner (see Figure 6).

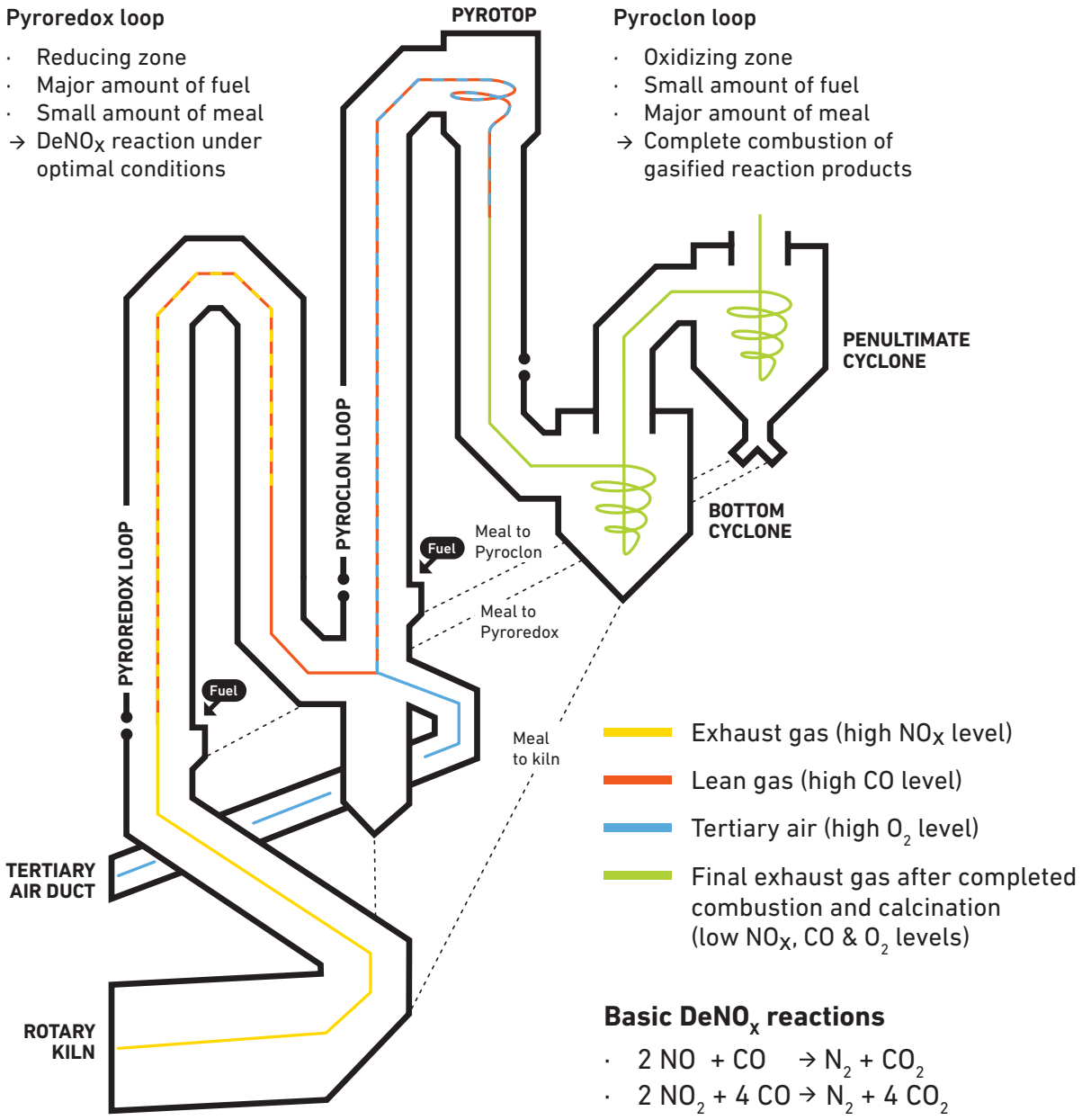

Figure 6: Pyroredox gas flow scheme.

From the beginning of development, it was decided to design the Pyroredox as an independent module (Figure 7). This allows installation of the Pyroredox as a retrofit solution in almost every preheater tower, regardless of original supplier, and without creating conflicts with existing equipment like fans, filters or even waste heat recovery systems.

In addition, it enables flexibility of retention time to take into account reactivity of different fuels. All typical calciner fuels, including AF, can be in used in the Pyroredox.

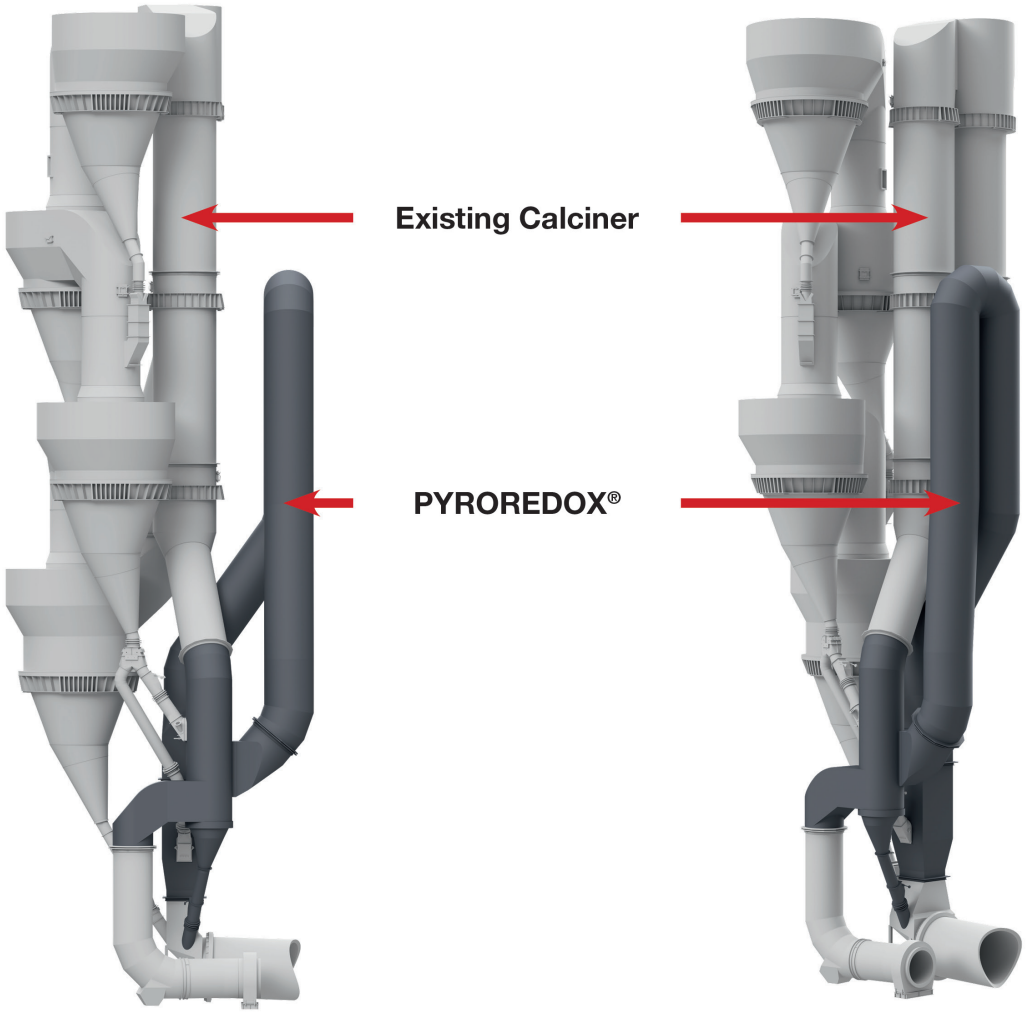

Figure 7: Example Pyroredox arrangement.

Installations

As retrofits are more common in today`s market than greenfield installations, the first Pyroredox installations were modifications to existing kiln lines. In China, permitted emission limits were reduced drastically in the last few years, resulting in extreme pressure on cement companies to invest accordingly. China Tianrui Group Cement Company Ltd in Henan Province decided in summer 2018 to contract KHD to upgrade two of their existing plants – Weihui (left image) and Xindeng (right image) - with Pyroredox reactors (Figure 8).

The kiln lines with inline calciners were originally delivered by SINOMA/TCDRI but, due to its modular design, integration of the Pyroredox reactors into the existing structure was possible with reasonable efforts. Total execution time for both projects was only seven months, and most of the erection work was done during normal operation. Consequently, only four weeks were necessary to connect the equipment to the existing calciner system, which could be completed during the regular winter maintenance shutdown.

Figure 8: Pyroredox installations in China.

After finishing erection works, commissioning was completed in January and February 2019. Due to very high air pollution conditions in Henan province at that time, operation of industrial plants was limited by further decreasing emission limits, and the two plants had to fulfil 100 days operation at 50 mg/Nm_3 NO_x. As NO_x abatement with Pyroredox alone was not designed to achieve these low levels, it had to be operated in combination with a SNCR system.

After more than a year of successful operation, the Pyroredox in combination with the SNCR system had proved capable of reducing emissions to below 30mg/Nm$_3$ NO_x and 8mg/Nm$_3$ NH_3. Capacity, fuel and power efficiency were not affected, and only moderate injection of ammonia is necessary to comply with the legal limit. Ammonia consumption in the SNCR system thus fell by 78%.

Compared to installation of SCR systems, the Pyroredox reactor represents a much lower investment and operational cost, while offering similar abatement of emissions (Figure 9).

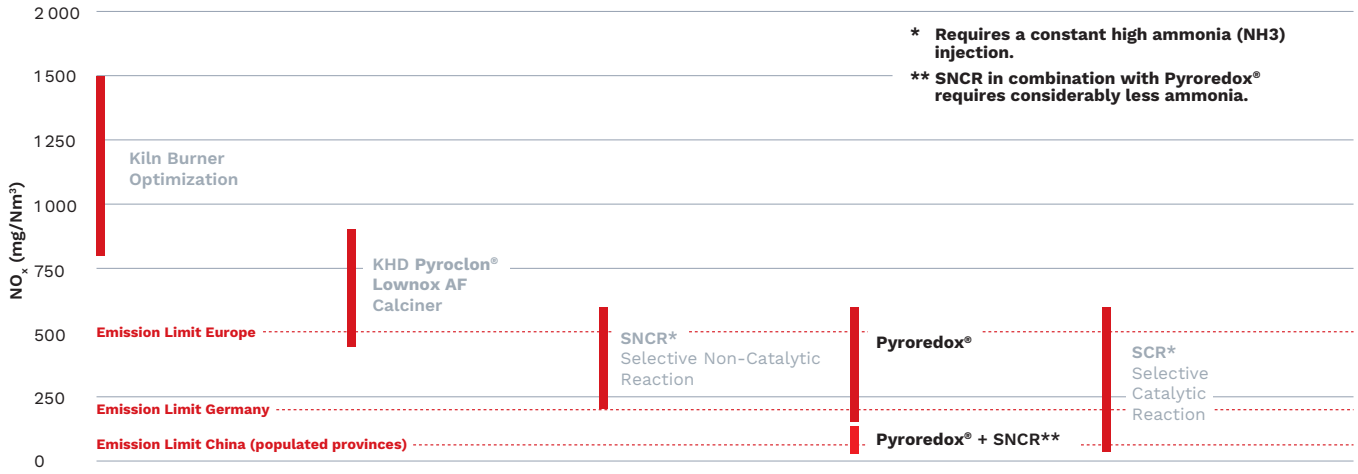

Figure 9: Achievable emission levels and regional limits.

Conclusion and outlook

Pyroredox and Pyrorotor are further examples of the innovative solutions introduced by KHD into the cement industry. Following market demand, the initial idea was systematically developed by first verifying it in an experimental setup and developing a suitable design, and finally executing the first prototypes successfully.

It is an effort that is never finished, however, and KHD will continue to support the cement industry with innovative solutions to further reduce the carbon intensity of clinker production.

polysius® pure oxyfuel technology for CO_2 capture in cement production

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Introduction

Today's resource consumption is far beyond sustainable limits. In order to preserve and improve global living conditions, the United Nations have agreed on sustainable development goals. The cement production is connected to many different goals; i.e. its CO_2 emission already contributes about 7% to the global CO_2 footprint. In addition, the cement production process requires large amounts of natural resources, i.e. lime stone, marl and fossil fuels and causes various gaseous emissions. However, sustainable solutions not only require the achievement of environmental standards, they have to comply with societal standards and need to be economically sound as well. thyssenkrupp Polysius is addressing this challenge with the "grey2green" strategy. All sustainable related techniques are bundled in this topic. Solutions are distributed to five clusters which address the main topics:

1. Emission mitigation technologies
2. Resource consumption reduction
3. Energy demand reduction
4. Cements and binders with higher resource efficiency
5. Smart solutions for improved automation and higher quality

The one major topic are carbon capture and utilization technologies. The answer by Polysius to this topic is the so called polysius ® pure oxyfuel technology.

Abstract

The polysius® pure oxyfuel process is a new type of clinker production process in which the otherwise normal ambient air is replaced by pure oxygen in the kiln combustion process. Compared with conventional plants, this novel process aims to concentrate, capture and reuse almost 100% of the CO_2 produced in a cost-effective manner. The next technology step is to further process the captured CO_2 with the help of renewable energies, e.g. into so-called "reFuels", in order to produce climate-neutral synthetic fuels, such as kerosene for air traffic.

Advantages of polysius® pure oxyfuel technology are, among others:
In the clinker burning process commonly used to date, oxygen from the ambient air supplied is used. The oxygen content of the ambient air is around 21%. By using the ambient air, nitrogen in particular is introduced into the system, so that the concentration of CO_2 in the exhaust gas is only about 25% - 30%.

By introducing pure oxygen with the polysius® pure oxyfuel process, atmospheric nitrogen is eliminated from the clinker burning process. The gas volume is reduced considerably and allows a high concentration of CO_2 in the exhaust gas, so that almost 100%

of the climate-damaging carbon dioxide can be captured.
Complex exhaust gas recirculation, as envisaged in the first-generation oxyfuel process, can be dispensed with here. This leads to overall reduced investment and operating costs for the polysius® pure oxyfuel process.

Carbon dioxide (CO_2) emissions during cement manufacturing

During cement manufacturing large quantities of carbon dioxide (CO_2) are emitted in the clinkering step (see Fig. 2). Only one third of these CO_2 emissions result from the combustion of fossil fuels, such as coal or pet coke, whereas the largest portion is released by limestone decomposition (see Fig. 1).

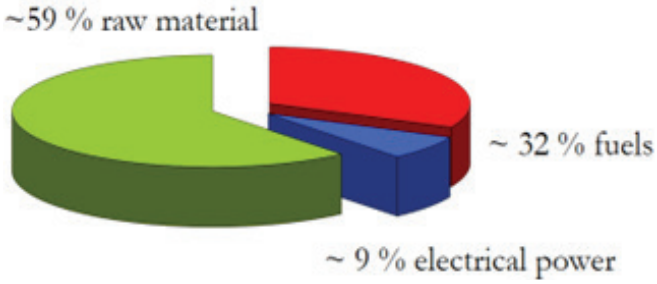

Fig. 1: CO_2 emissions conventional kiln line

Limestone, as the most important component of raw material for cement production, includes the major part of CO_2, depending on its quality.
Indirect emissions, e.g. from power generation, make up less than ten percent of the overall emissions (see Fig. 1). These emissions almost exclusively occur while producing the so-called Portland clinker. This intermediate product is burned in the kilns of cement factories and then ground with further additives to obtain cement as finished product. In this process Portland clinker constitutes the main component of cement.
The cement industry already makes use of numerous possibilities for reducing CO_2 emissions released in the manufacturing process. More efficient plants and combustion processes reduce raw material requirements; however, the so-called inter-grinding material also has an important influence on the overall emissions. As such granulated blast furnace slag from steel production, fly ash from power plants or also ground limestone can be used. The latter can also be used for cement manufacturing without removing the CO_2 contained in it.

Depending on the type of cement, this inter-grinding material can substitute only a portion of the clinker contained in the cement. Ultimately, clinker is indispensable for the process. The special properties of clinker ensure cement reactivity and, thus, strength development in concrete.

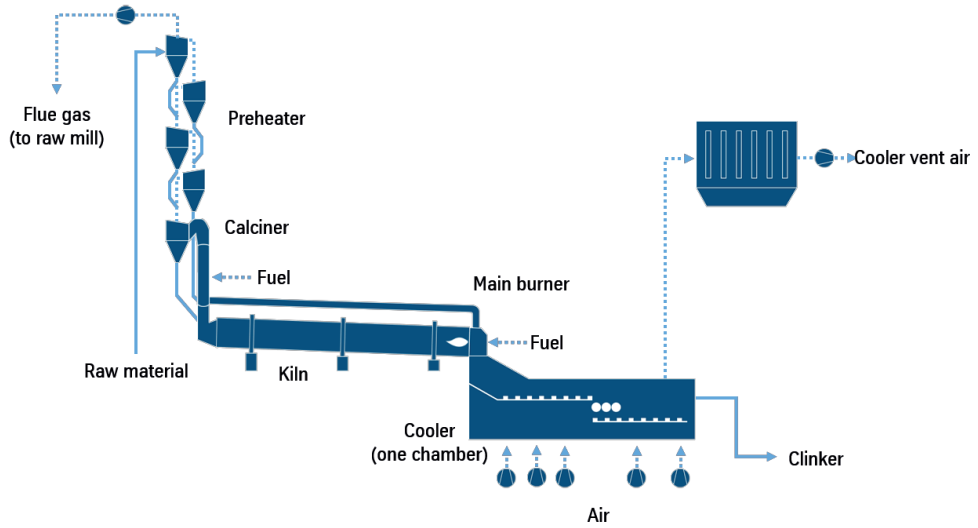

Fig. 2: Conventional kiln line

As it is inconceivable that the limestone as raw material will be substituted by other substances, the cement industry needs long-term solutions to avoid CO_2 emissions in spite of all efficiency measures. Such a solution is the carbon capture and storage (CCS) technology and, to a certain extent utilization of CO_2 (CCU), which is why in the recent years' numerous approaches were investigated to capture CO_2 originating from the clinker / cement manufacturing process.

Oxyfuel technology - 1st generation - principle

Apart from downstream processes such as CO_2 flue gas scrubbing or CO_2 separation by means of membranes, the so-called Oxyfuel combustion technology plays an important role. In this process, combustion air is substituted by pure oxygen so that the exhaust gas consists mainly of CO_2 and water vapour. As the CO_2 released from limestone is high in concentration, it is particularly advantageous not to mix this highly concentrated CO_2 stream with the nitrogenous combustion exhaust gas. The basic principle is shown in Fig. 3.

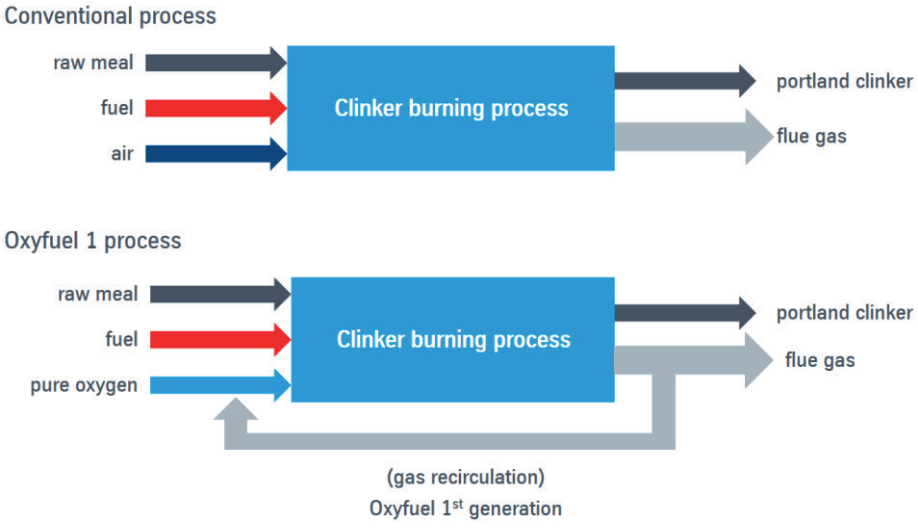

Fig. 3: 1st generation Oxyfuel technology principle

To operate a cement factory as Oxyfuel plant (see Fig. 4), pure oxygen is required in a first step. This pure oxygen can be produced in a cryogenic air separation unit, or originate from processes like water electrolysis.

In the place of air, oxygen is used as cooling gas in the clinker cooler and - after heating up - it is fed to the firing system of the clinker production. As no more nitrogen - contained in the air - is supplied to the pyroprocessing system, the gas volume in the plant is reduced accordingly. Because of this, it is impossible to convert an existing plant to the Oxyfuel process without further modifications, as the inadequately small gas volume will cause problems in the cyclone preheater.

To avoid this, existing plants converted to Oxyfuel technology are provided with an exhaust gas recycle system (1st generation Oxyfuel technology, basic principle as shown in Fig. 3.). Part of the CO_2 rich gas is returned to the cooler, thus increasing the gas volume and oxygen concentration to normal levels. The combustion air is thus substituted by a mixture of oxygen and carbon dioxide, while the oxygen concentration is kept at a level, which is approximately equivalent to that of air.

However, this flue gas recirculation requires quite an expenditure with regard to equipment and energy: In a first step the considerable process gas volume needs to be recycled which is simply unnecessary from the point of view of the overall process balance.

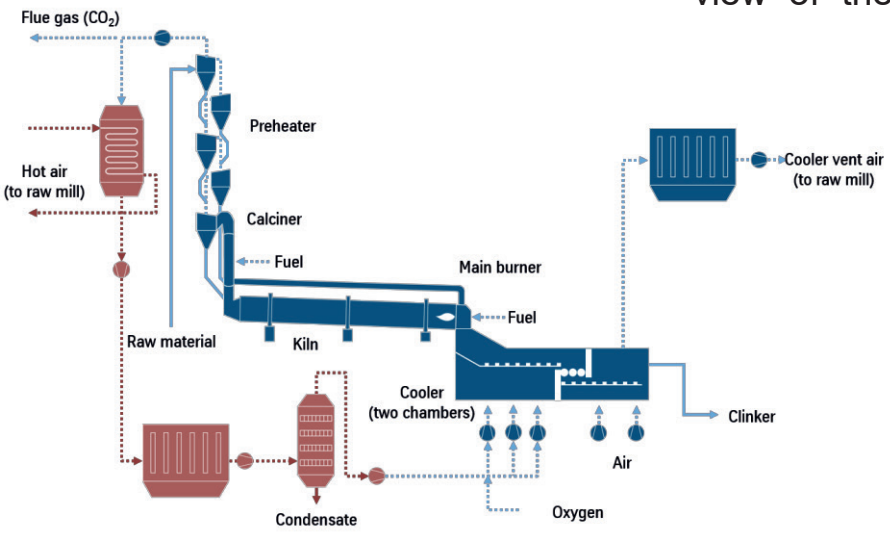

Fig. 4: Oxyfuel kiln line with exhaust gas recycle. Instead of air, a CO_2 rich recycle stream enriched with air is recycled to the clinker cooler. Red elements are additionally required for process implementation

In addition, the recycled gas also carries a portion of leaked air entering into the process. Recirculation results in an undesirable nitrogen enrichment in the Oxyfuel process. This impairs energy efficiency and contributes to the formation of nitrogen oxide in the area of the main burner flame. The recirculated gas is also required as cooling media in the clinker cooler. For this purpose, the gas must be adequately cooled and dried to ensure sufficient efficiency of the cooler and to avoid condensation in it. Summing up, existing plants can be converted to the Oxyfuel technology, but because of the necessary exhaust gas recirculation system, higher investment and operating costs are generated at a reduced CO_2 capture rate.

polysius® pure oxyfuel technology

thyssenkrupp Polysius developed an enhanced process for Oxyfuel operation (see Fig. 5, also referred to as Oxyfuel 2nd generation). This process requires adjustments to be made in the kiln line, particularly in the calciner, preheater, clinker cooler and the chlorine bypass, if any. The adjustments include an exchange or new equipment. The exchange particularly relates to any sealing used in the process, the gas separation in the cooler, material modification in any part of the kiln subjected to high temperatures and high oxygen atmosphere. But in exchange, the possible synergy effects related to oxygen as a feedstock are largely made use of. The polysius® pure Oxyfuel process is based on pure oxygen as combustion gas and does not require a costly and complex exhaust gas recirculation. Here pure oxygen is fed to the foremost zone of the clinker cooler and routed to the clinkering zone burner. In contrary to today's clinker production plants, all combustion oxygen is fed to the sintering zone burner. A combustion air bypass for the kiln inlet firing, the so-called tertiary air duct, is dispensed with. This approach ensures that the sintering zone burner is supplied with an adequate gas volume and that overheating of e.g. refractory and sintering zone burner is avoided.

Thus, the combustion gas routed from the sintering zone to the kiln inlet firing has an oxygen content of approx. 60-75 %. In the calciner burning zone this gas is converted together with the rest of the fuel. In spite of the high oxygen content, no excessive temperature increase occurs in this area as the decomposition of limestone results in a considerable heat sink, by that limiting the temperature in this area to approx. 930 C.

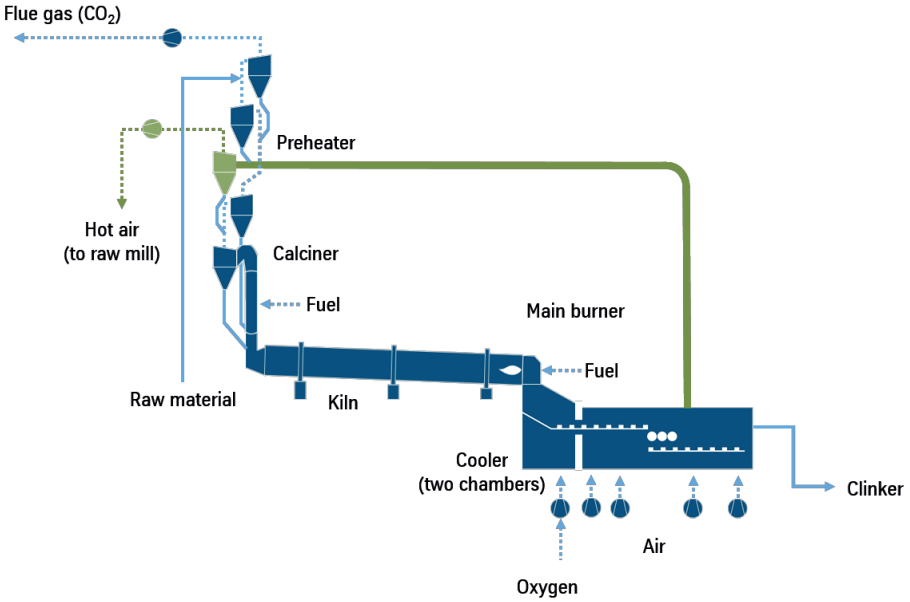

Fig. 5: polysius® pure oxyfuel process

In today's plants the exhaust gas downstream the kiln inlet firing is used for preheating the raw material. Because of the reduced gas volume, the exhaust gas downstream the kiln inlet firing is not sufficient for preheating. For this reason, in addition hot exhaust air from the clinker cooler is used for material preheating. This concept is limiting the portion of heat from the cooler to be conducted directly to the kiln. Instead, hot air from the rear section of the cooler is routed to the preheater bypassing the kiln. Here the heat can be utilised for material preheating; separate gas strings prevent mixing of the Oxyfuel exhaust gas and the hot air from the cooler. After leaving the preheater, the hot cooler exhaust air still contains sufficient thermal energy to supply the raw mill. Thus a thermal integration is achieved which is at least equivalent to the state of the art, and this without additional heat exchangers or similar equipment

In addition, many devices of such a plant can be designed considerably smaller; in particular, the preheater cyclones can be designed for approximately half the gas volume. Consequently, the preheater tower is substantially smaller as markedly mirrored in the investment costs. The lower costs for the preheater tower result from a substantially lower cyclone volume to be installed and, accordingly, a reduced height and diameter of the cyclones. As the tower height is dominated by the size of cyclones used, it can be significantly reduced when smaller cyclones can be used. This reduces the cost of the cyclone itself and thus the volume that can be filled in case of unforeseen blockage, which both is reflected in the civil design (catastrophe load) of the preheater tower.

Pilot Plant - polysius® pure oxyfuel technology

The technology described above has been developed in recent years and will be demonstrated in a pilot plant project.

Fig. 6: Project partner - catch4climate
https://catch4climate.com/

The four cement manufacturers Buzzi Unicem SpA - Dyckerhoff GmbH, HeidelbergCement AG, SCHWENK Zement GmbH & Co. KG and Vicat S.A. have assigned thyssenkrupp Polysius with the construction of a polysius®pure oxyfuel kiln system on the site of the cement plant in Mergelstetten in southern Germany (Project partner see Fig 6).

In this demonstration plant, the oxygen (O_2) is supplied via tanks and fed to the kiln system process. Then clinker is produced in the kiln line using the polysius® pure oxyfuel process to highly concentrate the emitted CO_2. In a final step, the CO_2 is liquefied in the purification unit so that it is ready for transportation. (see Fig. 6 from left to right). It is planned to go into operation with the demonstration plant in 2024.

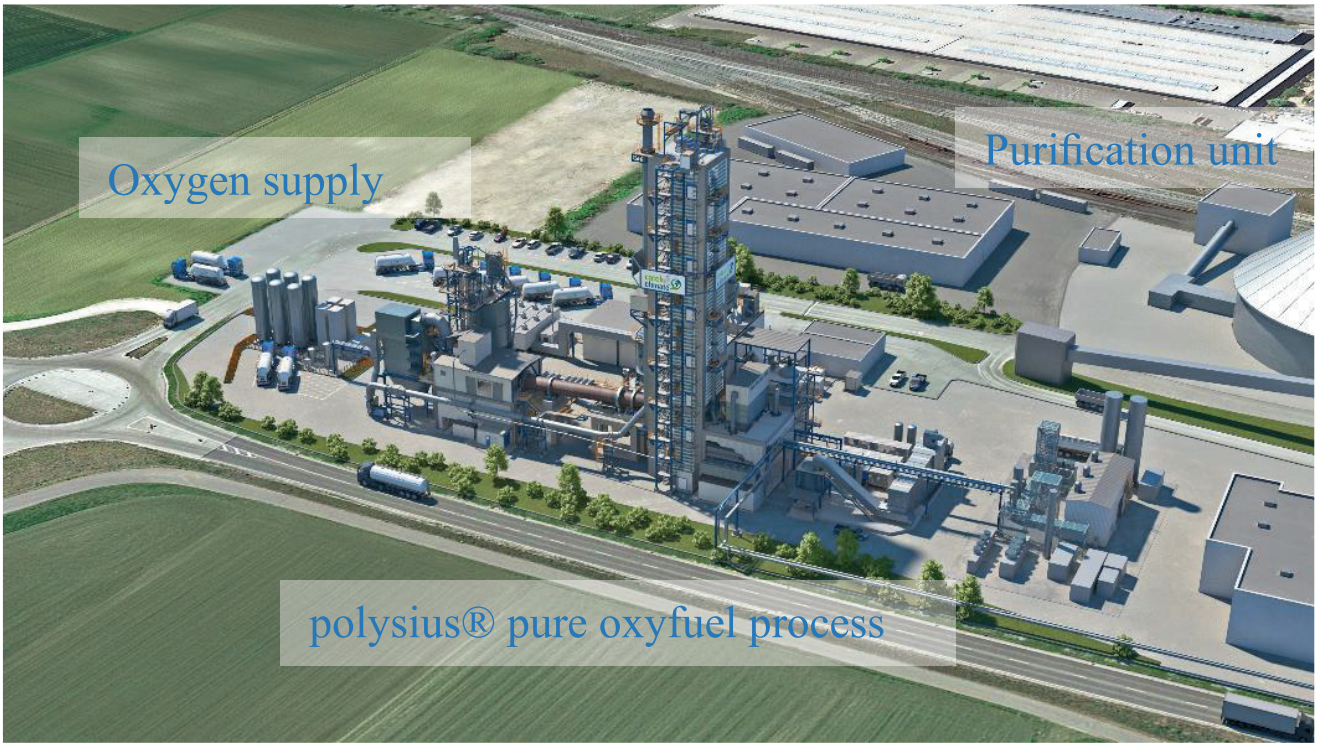

Fig. 7: polysius® pure oxyfuel process – 3D Modell

Our vision of a green polysius® cement plant - #grey2green

Today, one of the key challenges facing the cement industry is reducing carbon emissions in the cement manufacturing process. With the green polysius® cement plant solutions thyssenkrupp offers customers the opportunity for more sustainable cement production, which also meets customers' economic efficiency and plant productivity requirements.

Answering the demand for more sustainable cement production

Due to the increased demand for cement as a construction material – especially, in areas of urbanization – we at thyssenkrupp Polysius want to offer our customers solutions for the reduction of greenhouses gases in their cement production. Our green polysius® cement plant solutions are cost-efficient and have high output levels. Therefore, the answer to the increased demand for sustainable and eco-friendly cement is to make the transition from #grey2green cement manufacturing.

Our green polysius® cement plants will produce less CO_2 emissions and greenhouse gases. This is an advantage and competitive edge for our customers: Our plants will be able to meet strict local regulations and requirements for cement factories in the future. So, you are not only reducing your cement production's carbon footprint, you are also increasing the longevity and strengthening the position of your cement company in the highly competitive cement industry by choosing the green polysius® solutions.

At thyssenkrupp Polysius, we are a strong partner for our customers and offer everything from the construction to the delivery of our green polysius® solutions for your cement plants from a single source. We accompany our customers every step of the way of the cement plant implementation. By joining our vision of green polysius® cement plants your cement plants not only emit fewer emissions, they also consume less energy and save resources, which provides your cement production with an economic advantage. With our polysius® solutions you also take a step towards the Digitalization of the cement industry. Because not only do we use eco-friendlier components in binders, we also put digital technologies and Big Data to use to increase the efficiency of our green cement plants.

#grey2green: Join the future with our green polysius® solutions at

https://www.thyssenkrupp-polysius.com/en/green-technologies

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The Method of Reducing Carbon Footprint in Cement Plants

1. Energy Efficiency through False Air Reduction.
2. Compressed Air saving device - “A portable, economic hot-spot cooling solution to plug and eliminate routine energy waste in cement plants”

BY: KK SHARMA & KETAN GOELfrom
INVOTECH INDUSTRIAL SOLUTIONS
PVT. LTD., INDIA

Introduction:

In the present environmental scenario due to energy crisis and steep increase in the cost of energy and other input materials, it has become imperative to give a serious thought on how to make operations and equipment efficient towards use of energy and adopt latest technology equipment to retain the requisite competitive edge in the market, discusses KK Sharma of Invotech Industrial Solutions Private Limited.
India was the second largest cement producer in the world in terms of cement capacity during 2022. Therefore, one can easily assume the amount of energy being consumed in cement production facilities and its wastage attributed to non-availability of proper technology to plug the leakages. We can find hundreds of research papers / case studies discussing the effect of different factors on energy consumption in cement manufacturing facilities. Some researchers also discuss this issue with the help of mathematical models. However, all the researchers more or less agree to the fact that ‘FALSE AIR” not only but may be one of the factors of more energy consumption in cement industry. Further, based on the several studies in the field of operational audit, it can be concluded that production level can be improved and energy consumption minimized by reducing “FALSE AIR” as well as improving energy efficiency.

What is false air?

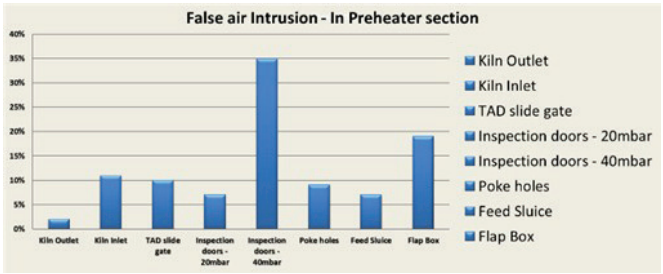
False air is any unwanted air entering into the process system. The exact amount of false air is difficult to measure. However, an indicator of false air can be, increase of % of oxygen between two points (usable for gas stream containing less than 21% of oxygen). Due to unwanted air, the power consumption increases and system’s temperature decreases. Therefore, to maintain the same temperature fuel consumption has to be increased.

Impact of false air in cement plant

1.Increase of power consumption
2.Increase the fuel consumption
3.Unstable operation
4.Reduction in productivity
5.Higher wear of fans

False air intrusion points

In Cement Plant, generally false air intrudes in Kiln section through Kiln outlet, inlet seal, TAD slide gate, inspection doors and flap box. Similarly, in mill section false air intrudes through rotary feeder at mill inlet, Mill body, Mill door, flaps, expansion joints, holes of ducts and tie rod entry point.



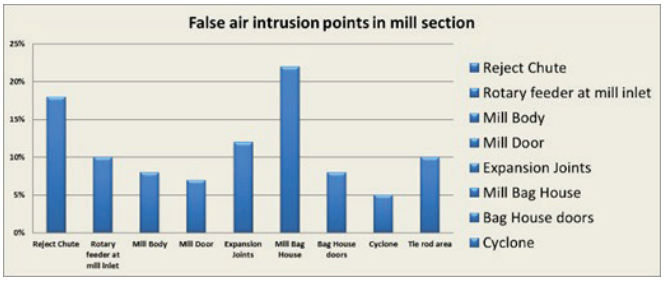
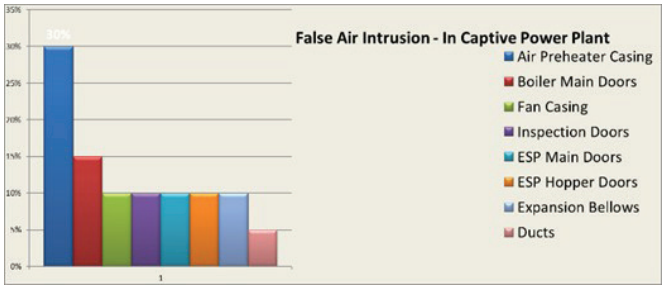


Fig. 01 False air intrusion points in Kiln & Mill section.

In Power Plant, generally false air intrudes in CPP section through Air Pre-heater Casing, Boiler Main door, Fan Casing, Inspection Doors, ESP Main doors, ESP Hopper Doors, Expansion bellows, Ducts. Similarly, in GPP section false air intrudes through Main holes, Hammering, Bellows, Rotary Air Locks, Damper Casing, Expansion Bellow etc.



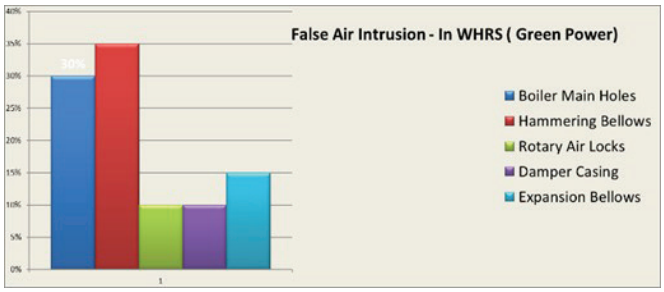


Fig. 02 False air intrusion points in cpp & gpp.

How to measure false air

The formula used for measuring false air is as under:

$$\%\ \text{of False Air} = \frac{\%\ \text{Outlet } O_2 - \%\ \text{Inlet } O_2}{20.99 - \text{Outlet O}} \times 100$$

Atmospheric air normally has a content of 0% CO and 20.99 % O_2.

How to measure false air across pre-heater and mill:

Based on the oxygen content and flow measurement at particular location, we can find out amount of false air across the Pre-heater and mill circuit. For this purpose, % of O_2 is measured at different locations i.e., Pre-heater inlet and outlet, cyclone Inlet and Outlet, Mill inlet and outlet, mill outlet to fan inlet, across Bag-house or ESP.

False air detection through ultrasonic leak detector:

Ultrasonic Leak detectors often called sniffer, especially designed to find small leaks, are being used in Power plants. However, Cement plants are still lacking use of ultrasonic leak detector. Since ultrasonic leak detectors search for the sounds of leaks rather than escaping gases, they are able to detect leaks of any gas type. Though the device is unable to measure gas concentration, it is able to determine the leak rate of an escaping gas because the ultrasonic sound level depends on the gas pressure and size of the leak.

Fig. 03 False air detection by ultrasonic leak detector

Functioning of ultrasonic leak detector:

When gas escapes a pressurized line, it generates a sound in the range of 25 kHz to 10 MHz, well above the frequencies, the human ear is sensitive to but in a range easily identifiable to Ultrasonic Sensors. When the detector senses ultrasonic frequencies, they are isolated from normal background noise, amplified, and converted to a frequency audible to humans.

Detection principle:

When a gas passes through a restricted orifice under pressure, it goes from a pressurized laminar flow to low pressure turbulent flow. The turbulence generates a broad spectrum of sound called “White Noise”. There are ultrasonic components in this white noise. Since the Ultrasound is loudest at the leak site, it can be detected very easily.

False air arresting in cement and power plants

Usually Cement and its associated Power plants use conventional methods to arrest false air, but these conventional methods are not reliable or permanent in nature. In fact, it works more like a silencer & just after few days it gets damaged.

X

Fig 04: Conventional False Air arresting methods (By Sodium Silicate + Mortar/Raw Mill Powder, By Ceramic Blanket + Sodium Silicate)

X

Fig 05: Conventional False Air arresting methods (By Ceramic Paper + Sodium Silicate)

Therefore, Invotech Solution & Systems now Invotech Industrial Solutions Private Limited, a Rajasthan based company have come up with a unique product range after their years of extensive research, which are being used in many Cement manufacturing facilities and their associated power plants. Their client list figures renowned names like- JK Cement Group, Dalmia Bharat Group, Nirma Group (Nuvoco Vistas Corp. Ltd.), Ultratech Group, India Cements Group, Sagar Cements, Birla Corporation, The Mehta Group, Shree Cement Group, Chettinad Cement, Tata Chemicals, Jindal Saw and many more in pipe line.

Invotech Industrial Solutions Private Limited provides innovative & Cost-effective Industrial solution for arresting False Air in cement plants i.e., Pyro-Process, Raw Mill, Coal Mill, Cement Mill section & Bag-House and its associated power plants. The 'Arrest Master' (Product Name) is user friendly and safe to use.

Product range: false air arresting compound

1. Arrest Master 1001: For Upper Cyclones, VRM's & Power Plants, Shell temperature resistant upto 1800^{0}C
2. Arrest Master 1002: For Bag-House & Bag-Filters Top Doors.
3. Arrest Master 1003: For High temperature zone upto 5000^{0}C.
4. Arrest Master 1004: For High temperature zone upto 8000^{0}C.
5. Arrest Master 2001: For areas having vibrations, Shell temperature resistant upto 1800^{0}C

Fig 06: False Air Arresting by Arrest Master Range of Products.

Properties of arrest master- false air arresting compound:

Application of 'Arrest Master Series' of product brings down the level of false air and it is useful in all Cement and Power Plants. It hugely impacts plant productivity and contributes towards better housekeeping. Its other characteristics are:

1. Gets further strong with heat.
2. Once cured, Arrest Master becomes rock hard ensuring no leaks.
3. High compressive strength & impact resistant, which can only be removed by hammering.
4. Non-Shrinkable properties & No tools required for application.

CASE STUDY

- Double String, 5- Stage ILC Pre-heater, KHD
- Annual losses due to False Air- 56.22 Lacs
- Products used- 2.09 Lacs
- Payback Period- 0.37 Month

Case Study- Star Cement Mehgalaya Limited, Meghalaya

S No	Particulars	Plant Details			
1	Type Of plant	Double string ILC		Dt. 21st Sept, 2022	
1.1	Kiln length	67	Mtrs		
1.2	Kiln Dia	4.4	Mtrs		
1.3	Heat Consumption	690-710	KCal/Kg - Clinker		
1.4	Type of Cooler	Static-grate cooler(KHD)	Grate		
1.5	Calciner Type	ILC	ILC/SLC		
1.6	PH Make	KHD Humboldt	KHD/FLS/Polysius		
1.7	PH Stages	5	Nos		
S No	**Parameters**	**Unit**	**Values**		
2	Plant Data				
2.1	Kiln Feed	TPH	391		
2.2	Clinker Factor		1.54		
2.3	Clinker production	TPD	6094		
2.4	Barometric Pressure at site	mmWg	9832		
2.5	Barometric Pressure at sea level	mmWg	9781		
2.6	Ambient Temperature	Deg C	29		
2.7	Power Cost	Rs/Unit	7		
2.8	Coal CV	K Cal/Kg Coal	4700		
2.9	Coal Cost	Rs/Kg	8.5		
3	**Reduction in False air after using " ARREST MASTER 1001"**				
3.1	Reduction in False air	%	1.99		
	Parameters	**Unit**	**Kiln string**	**Pyro string**	**Total**
4	Preheater outlet				
4.1	Temperature	deg c	309	307	
4.2	Draft	mmWG	-690	-685	
4.3	Flow	M3/h	385000	390000	
4.5	Flow	Nm3/h	168795	171670	340465
5	False air = 1.99 %				
5.1	False air volume	Nm3/h	3359	3416	6775
5.2	False air = 1.99 %	M3/h	7710	7810	
6	LOSS				
6.1	Loss on account of Power in SG fan	kwh	17	23	40
6.2	Loss in money	Rs./hr	120	159	279
6.3	Loss on account of heat	Kcal/hr	333174	336376	669550
6.4	Loss in money	Rs./hr	250	252	502
6.5	Total Loss in money	Lacs per annum	26.64	29.58	**56.22**
6.6	Cost of Arrest Master used 1001	Lacs	2.09		
6.7	**Payback period**	**Month**	**0.37**		
Note: Considering 300 days run plant in a year					
Conclusion: Arrest Master 1001 - Cost-effective Industrial Solution					

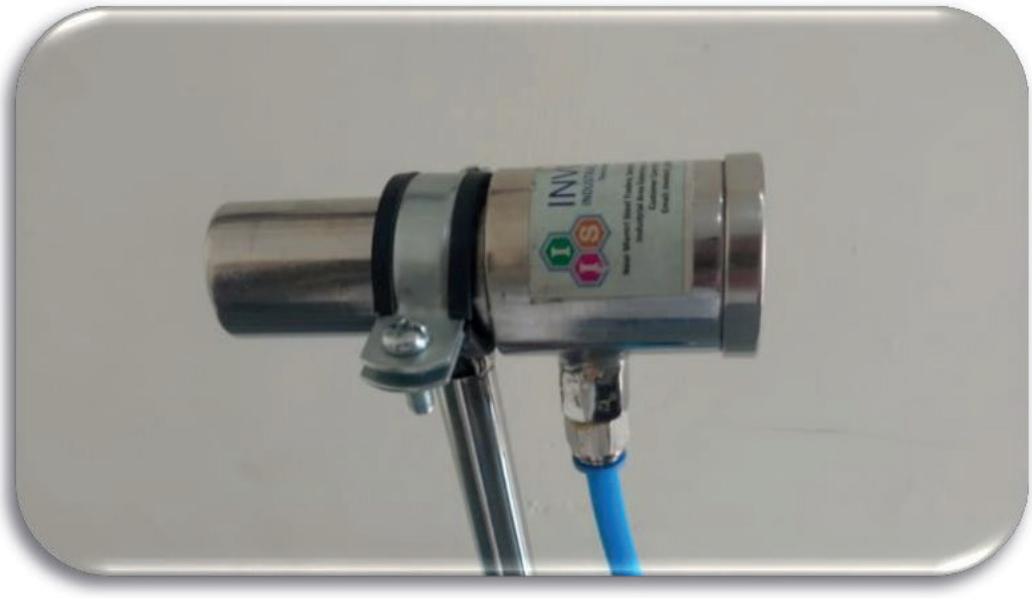
Compressed Air saving device - "A portable, economic hot-spot cooling solution to plug and eliminate routine energy waste in cement plants"

Compressed air is a very useful tool in cement manufacturing process. It is used to provide the energy to move materials and items of equipment. However, it is a very expensive form of energy. The air is almost always compressed by electrically-driven screw compressors. Unfortunately, only 10 per cent of the electrical energy input goes for producing useful mechanical work. The remaining some 90 per cent is lost as heat with compression and idling losses being the greatest. Owing to this, Compressed air is such an expensive form of energy.

Energy efficient solution

We at IISPL, took this issue as a challenge and started identifying the ways for eliminating routine wastes, which cause higher energy consumption in cement process industry. We also studied on means to provide best and economic solution to cement industries so as to save production cost as well as conserve natural resources. Having done in depth study, Invotech Industrial Solutions Private Limited has recently developed a product called Arrest Master ABS for enhancing energy efficiency. It can be used to cool down the area rapidly with less air consumption but gives output 7 to 8 times as compared to normal air consumption. It is a special design Nozzle, works on COANDA EFFECT.

Arrest Master ABS uses little amount of compressed air to deliver high volume output. Arrest Master ABS, is a compressed air boosting device, which has been designed in a way so as to give trouble free & maintenance free service as there is no moving part in it. It can also be used to cool down bearing housing, cutting hot material, cooling of lathe machine jobs etc.



Arrest Master ABS: Compressor air saving Nozzle System- For Kiln Shell, Bearing housing cooling

Bearing housing cooling by Energy efficient device
(Arrest Master ABS)
Input @ 6 Bar = 11 CFM, Output= 77 CFM,
Atmospheric contribution= 66 CFM

Product highlights of arrest master ABS

- Energy efficient device
- Provides efficient cooling
- User friendly & ready-to-use modules
- Easy installation and Relocation

POWER CONSUMPTION COMPARISON OF ABS V/S FAD & AXIAL FAN

	Cooling By	Consumption	Power cons.	Per day Cons	Power Rate	Power Cost	Yearly cost
A	½ inch pipe (With compressed air)	100 CFM	20 KW	480	6	2880	950400
B	By Axial fan (5.5 KW motor)		5 KW	120	6	720	237600
C	ABS	11 CFM	0.2 KW/CFM	52.8	6	317	104544
	ABS savings V/S FAD ½ inch pipe	9 times less power cons with compare ½ inch pipe line air					
	ABS saving V/S Axial fan	2.25 times less power consumption with compare with Axial fan					
	Payback period	22 Days (Compare ABS V/S Axial fan)					
	Pay back Pd.	3 Days (Compare ABS V/S FAD ½ inch)					

ARREST MASTER ABS- THREE NOZZLE ARRANGEMENT FOR KILN SHELL

CONVENTIONAL PRACTICE

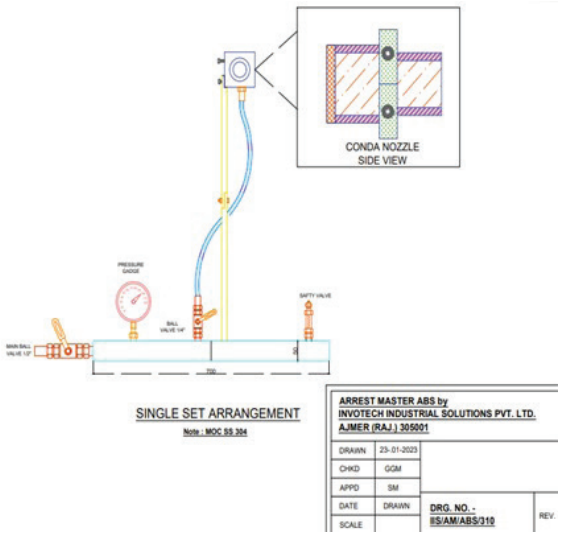
AIR OUTPUT = 200 CFM BY TWO ½ INCH LINES
TOTAL CONSUMPTION= 200 CFM

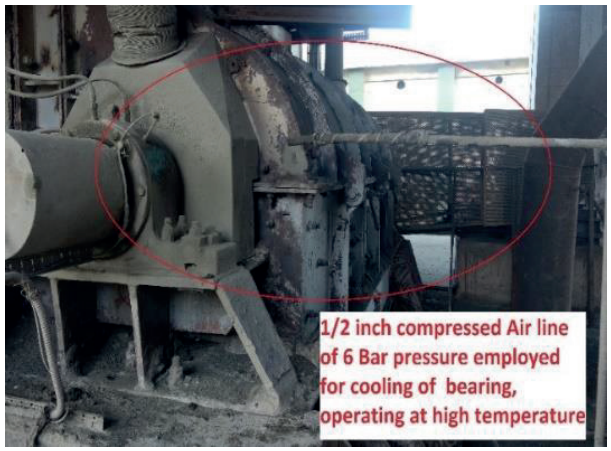
Launched Arrest 16th NCB International Seminar on Cement, Concrete & Building Materials held from and 03rd to 06th Dec, 2019 at Manekshaw Center, New Delhi.
Master ABS System at: -

ARREST MASTER ABS- THREE NOZZLE ARRANGEMENT AT KILN SHELL

AIR INPUT= 11 CFM/NOZZLE
AIR OUTPUT= 77CFM/ NOZZLE
TOTAL OUTPUT= 231 CFM
TOTAL AIR CONSUMPTION= 33 CFM

ARREST MASTER ABS- SINGLE NOZZLE ARRANGEMENT





CONVENTIONAL PRACTICE

AIR OUTPUT = 100 CFM BY ½ INCH LINE
TOTAL AIR CONSUMPTION= 100 CFM

ARREST MASTER ABS- SINGLE NOZZLE ARRANGEMENT AT BEARING HOUSING

AIR INPUT= 11 CFM/NOZZLE
AIR OUTPUT= 77 CFM/NOZZLE
TOTAL AIR CONSUMPTION= 11 CFM

Product highlights of arrest master ABS

- Energy efficient device
- Provides efficient cooling
- User friendly & ready-to-use modules
- Easy installation and Relocation

Invotech Industrial Solutions Private Limited keeps itself abreast of latest development in Cement Industry so as to cater the need of the Industry using latest technology and quality systems. Also, with a view to retain the requisite competitive edge in the market, participated in various Seminars, details as under:

1. Participated in 15th, 16th & 17th NCB International Seminar on Cement, Concrete and Building Materials, 2017, 2019 & 2022 at Manekshaw Centre, New Delhi, India.

2. "National workshop cum technology exhibition to promote energy efficient & cleaner production for sustainable industrial growth" held from 8th to 9th March, 2018, at India Habitat center, New Delhi, where presented a Technical Paper on "SIGNIFICANT SAVINGS IN ENERGY THROUGH FALSE AIR REDUCTION" & received an award for "UPCOMING ENTREPRENEUR IN THE FIELD OF ENERGY EFFICIENCY" presented by Mr. Pankaj Kumar, Secretary, Bureau of Energy Efficiency.

3. 14th Green Cementech in 2018 held from 17th to 18th May, 2018 at Hyderabad International Convention Center, Hyderabad where we presented Technical Paper on "Enhancing Energy efficiency in Captive Power Plants by reduction of False Air". Also attended 16th Green Cementech in 2020 through Online mode.

4. Articles published in prestigious publications:

a. CMA's Technical Journal "CEMENT ENERGY & ENVIRONMENT"

I. "ENERGY SAVINGS THROUGH FALSE AIR REDUCTION", Vol. 17 No. 1 (Jan – Jun 2018).

II. "ENERGY SAVINGS BY REDUCTION OF THERMAL LOSSES FROM KILN SHELL", Vol. 18 No. 1 (Jan – Jun 2019).

III. Our latest article COMPRESSED AIR SAVING DEVICE "A PORTABLE, ECONOMIC HOT SPOT COOLING SOLUTION TO PLUG AND ELIMINATE ROUTINE ENERGY WASTE IN CEMENT PLANTS", Volume 20, No. 01 (Jan-June 2021)

IV. "USE OF AFR IN CEMENT INDUSTRY: NEED OF THE HOUR", Vol XXI-I (Jan – Jun 2022).

e. INDIAN CEMENT REVIEW Magazine

I. ENERGY EFFICIENCY THROUGH FALSE AIR REDUCTION" VOLUME 35, April 2021, NO 9.

c. ARAB UNION FOR CEMENT AND BUILDING MATERIALS, U.A.E.

I. "THE METHOD OF REDUCING CARBON FOOTPRINT IN CEMENT PLANTS", No. 84, June 2021

5. Recently our Product “ARREST MASTER ABS: COMPRESSED AIR SAVING DEVICE FOR COOLING APPLICATIONS” was nominated for NATIONAL ENERGY EFFICIENCY INNOVATION AWARDS-2021 and we have been felicitated with above award by, Bureau of Energy Efficiency, presented by Hon’ble Union Minister Shri R.K. Singh, Ministry of Power & New and Renewable Energy on 14th Dec, 2021 at Vigyan Bhawan, New Delhi.

Conclusion

Substantial potential for energy efficiency improvement exists in the Cement and Power industry. Persistent efforts are also being made to improve energy efficiency and reduce energy cost for the Cement and Power industry for survival and growth. Our baby step towards arresting “FALSE AIR” & “COMPRESSED AIR SAVINGS” and thus improving “ENERGY EFFICIENCY” can contribute immensely towards cost cutting of cement and power manufacturing and improving energy efficiency. It is needless to mention that our efforts to improve energy efficiency will also minimize greenhouse gas and mitigate the environmental problems associated with cement and power production.

ABOUT THE AUTHOR

Author: K.K. Sharma is a renowned Chemical Engineer, Process Expert & Founder of Invotech Industrial Solutions Private Limited.

Co-Author: Ketan Goel is an experienced Mechanical Engineer with a demonstrated history of working in the mechanical & industrial engineering industry. Presently working in IISPL.

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1.Educational Qualification:

a.B.Tech. Mechanical. Certified for Asset Condition Monitoring using Ultrasound.

b.Currently appeared for BEE Energy Auditor Exam 2022.

2.Current Profile:

a.Experienced Mechanical Engineer: Skilled in Analytical Skills, Public Speaking, Process Engineering, Renewable Energy Technology, Teamwork and Project Management.

3.Ongoing Projects Under Development:

a.Exploring the “ARREST MASTER ABS: COMPRESSED AIR SAVING DEVICE FOR COOLING APPLICATIONS” for drastically reducing the consumption of compressed air in Existing Bag-house and Bag-filters (Under Development)

b.Commercial Trial of Liquid AFR Firing Nozzle for incineration of Liquid Hazardous waste in Cement Plant. (Successful Launch)

c.We have been developing coating to enhance the refractory life of castable in cement plant. (Under Development)

Current status of CO_2 reduction technologies

By: Mark Mutter, JAMCEM Consulting, UK

Introduction

The emission of CO_2 in the manufacture of clinker is the biggest challenge that the cement industry has ever faced. Whilst the industry itself has known it produces around 8% of the worlds CO_2, this knowledge has not been in the public domain until relatively recently and the actions of cement companies are under scrutiny by many stakeholders. At JAMCEM Consulting, our workload has increased to between 30-40% of our work being focused on CO_2 reduction – whether this is on the development of novel products and processes or assisting cement producers to reduce the CO_2 emissions at the plant through optimisation and the use of alternative fuels. The article provides some discussion in relation to the driving forces in CO_2 emissions reduction and some of the latest developments with technology and products aimed at overall reductions in the impact of the cement industry on the global climate.

CO_2 reduction and emissions trading schemes

Much of the progress to date in terms of reduction of emissions of CO_2 has been in countries that have either carbon taxes or emissions trading schemes. However, the countries and regions that have such costs attached to CO_2 emissions is only a small part of the global cement production capacity. The introduction of such schemes also results in an "uneven playing field", with those countries that do not have costs associated with CO_2 emissions being able to produce cement at a lower cost and then export to countries which do have emissions costs. This can simply lead to moving the problem of CO_2 emissions from one country to another, without tackling the core problem. This issue has been picked up by the EU, which has proposed the Cross-Boarder Adjustment Mechanism, whereby imports of cement into the EU will incur a tariff relating to the emissions created from the production of that cement in the exporting country.

The EU Emission Trading Scheme (ETS) is the scheme that has been in place for the longest, although it has been through a number of iterations prior to arriving at its latest structure, which is Phase 4 of the scheme. Key points of the scheme are as follows:

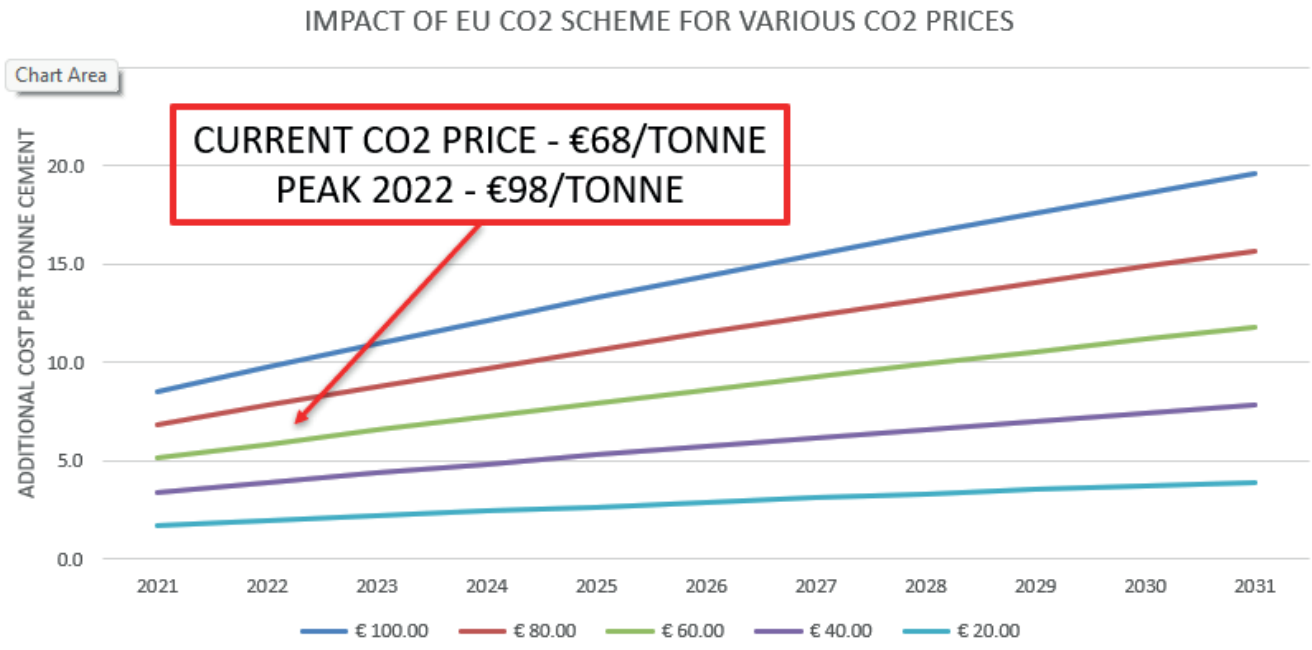
- Benchmark CO_2 emissions per plant at 693kg CO_2/clinker on which the free allowance is based (this equates to the performance of the top 10% of plants in Europe).
- New historic activity level based on 2014 – 2018 production.
- Reduction in free allowance of 2.2% per year.

- Facility to add or remove CO_2 from the market to manage CO_2 price.

Under these rules, the allowance of free CO_2 credits reduces year on year, meaning that a cement producer that does nothing will have to purchase more and more credits each year. It should be noted that this scheme is based on tonnes of CO_2 up the stack, not other metrics such as CO_2 per tonne of cement.

Not only is the allowance decreasing but the cost of CO_2 is increasing. Shown below is an example of the forecast additional costs to a cement producer emitting 800 kg CO_2/tonne clinker at different prices of CO_2 and considering the reduction in the annual allowance of 2.2% per annum.

The graph shows that at current market prices, the additional cost per tonne of cement will be around €14 by 2030. Whilst this cost could potentially be passed on to customers, that scenario will only work if none of the producers within a specific market take any action to reduce CO_2. Those that take action to avoid this additional cost will benefit from a much-improved competitive position and can also demonstrate that their product is a lower carbon product compared to their competitors.



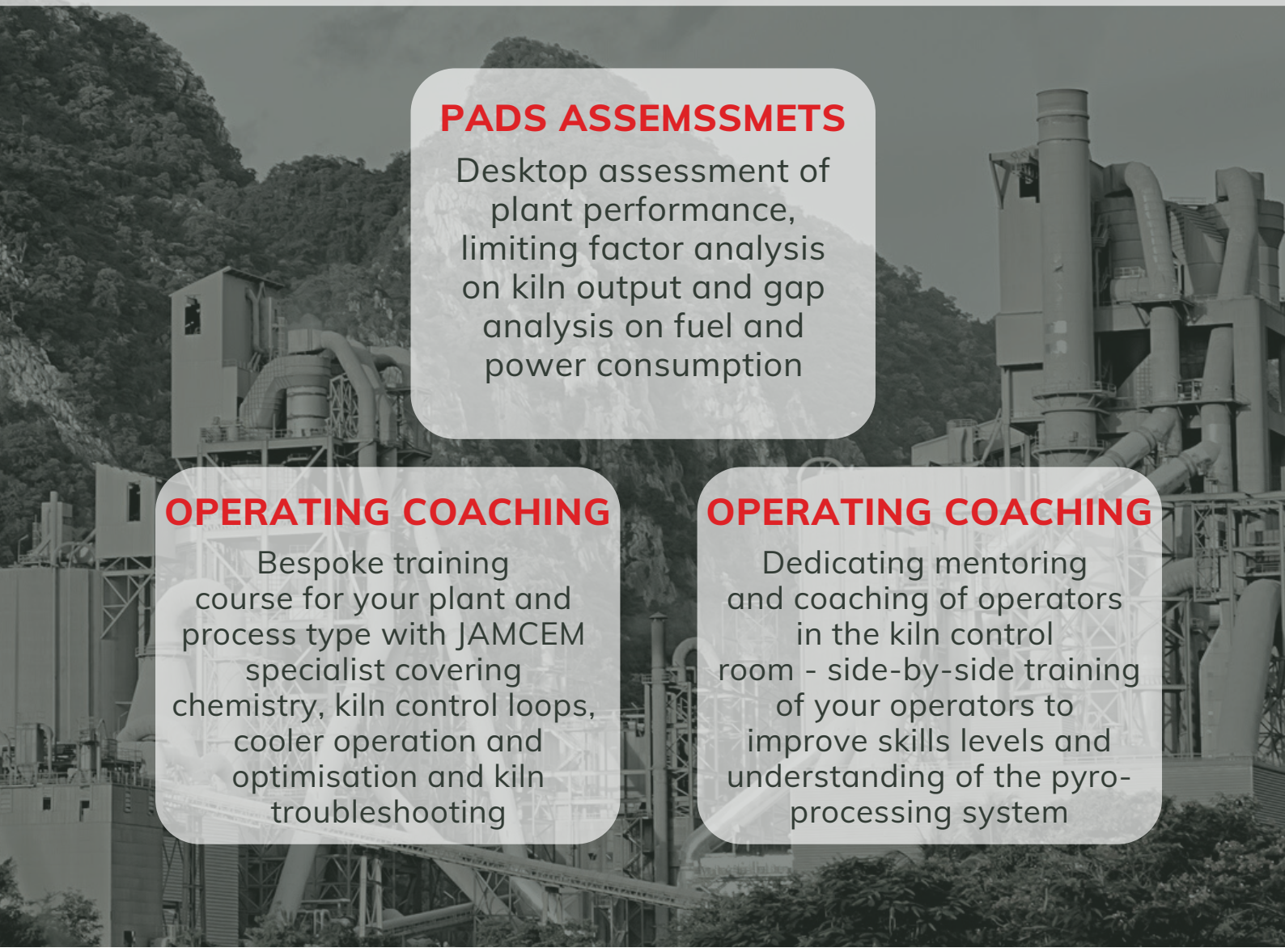
Metrics

Whilst we consider CO_2 emissions, we need to ensure that we consider the emissions in the right way. Since it is the production of clinker and not cement that is responsible for the direct emissions of CO_2, it should be either absolute emissions of CO_2 or CO_2 per tonne of clinker that is considered and not the CO_2 emissions per tonne of cement, as it is only the reduction of CO_2 up the stack that will reduce the impact on the environment of the cement industry.

JAMCEM CONSULTING

KILN OPERATIONS OPTIMISATION

Kiln operators have one of the most important jobs on a cement plant and one where their actions can have a real-time impact on the profit and loss of the plant. They affect the kiln output, fuel and power consumption, clinker quality, plant emissions and the life of the refractory. But cement plant owners rarely invest in training, development and coaching of their operators to improve profits – JAMCEM can provide these services with its systems and kiln master burner services



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OPERATING COACHING

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CO_2 per tonne of cement can be easily used to demonstrate improvements in performance which in fact do nothing for the environment. An example of this is limestone cements. When additional limestone is added to the cement, the strength of the product invariably decreases, which leads to the concrete manufacturer having to put more cement into the mix to give the same strength in concrete, creating no overall reduction in CO_2 emissions. Even if cement strengths were to remain the same with additional limestone, the only way a reduction in CO_2 would be achieved would be to reduce the manufacture of clinker, as opposed to increasing the overall cement production due to the increased limestone addition rate.

CO_2 reduction technologies

Many cement manufacturers are basing their futures – at least in part – on the business-as-usual scenario i.e., to continue to use the existing equipment, with some modifications, to continue to manufacture clinker. The three main technologies under development are briefly discussed below:

Carbon capture: This technology is already being widely installed around Europe and other locations; the drawback with retro-fitting the equipment is that the waste gas from the pyro-processing system has to be split down into the different gaseous elements and compounds before the CO_2 can be captured. The current costs of installing a carbon capture system is extremely high and once captured, it is necessary to consider what to do with the CO_2. The projects that are in process at this time are all based around storing the CO_2 in underground facilities (old oil and gas fields) as opposed to finding a use for the CO_2 that is captured.

LEILAC: This technology aims to produce a pure stream of CO_2 from the calcination of the limestone in the pyro-processing system, thereby reducing the high cost of the purification of the gas stream from the process and thereby allowing the CO_2 to be directly stored or transformed into another product for use. The system is now on its second stage of trials in Europe with some technical issues to overcome as well as the consideration of how to scale the technology to larger kiln systems.

Oxyfuel: The Oxyfuel process works through the replacement of combustion air with pure oxygen, again leading a pure stream of CO_2 for storage or use. Again, this system is still under development and will require a cheap source of O_2 as well as some technical issues still to be overcome.

With all of these technologies, the cement industry needs to consider whether putting CO_2 into the ground is a responsible and sustainable solution.

Other developments on the technical side include the curing of concrete with CO_2, use of hydrogen to increase the use of biomass in the pyro-processing system and the use of plasma technology in the calcination of limestone.

New products

The other side of the CO_2 reduction challenge is to move away from clinker-based cements and use alternative binders in concrete. The two main products which stand a good chance of commercialisation and of having a real impact on CO_2 reduction are mentioned below:

Geopolymers: Geopolymers are not new materials – they have been around since the 1970s but never gained commercial success – mainly due to the incumbent players in the cement industry. Geopolymers rely on slag and fly ash as the core components, with an activator reagent. However, these source materials are already widely used in readymix concrete, and their supply is reducing due to the reduction in the use of coal to produce electricity as well as the introduction of electric arc furnaces for steel production. There may, however, be scope to replace slag and fly ash with pozzolans and calcined clays. One drawback with geopolymer cement is that they cannot be used with conventional cements.

Calcined clay: As with geopolymers, these are not new materials, as the properties of calcined clays have been known for some time. Calcined clays are naturally occurring clays which, when heated to a specific temperature range, undergo chemical transformations which result in cementitious properties being developed. The temperature required for this reaction is lower than for clinker manufacture and therefore results in less CO_2 per tonne. These materials can then be ground with clinker to reduce the total emission per tonne of product. Whilst clays are abundant, it is not all clays that can be used, the temperature range can be quite specific and changes dependent upon the type of clay. Therefore, thorough investigation of the clay is required prior to investing in equipment to produce the calcined clay.

In addition to these materials there are many other developments such as biological cements, low lime cements, magnesia-based cements etc. which are all at various stages of research.

One issue that will need to be addressed with any new type of binder is that of the cement and concrete standards, which are largely written around cements that are produced with clinker i.e., composition-based standards. In order to increase the scope for the use of these alternative binders, the industry needs to move to a system of performance-based standards.

Conclusion

It is clear from the information presented that there is significant activity within the industry and with new products that can support the reduction of CO_2; however, it is likely that there is not one single solution and that there will need to be a combination of technologies and new materials. In the long term, it is likely that there will have to be a reduction in the quantity of clinker manufactured to accommodate these new materials. In addition, the industry needs to consider whether putting CO_2 into holes in the ground is really the most responsible and sustainable action.

Flash activation of clay: high product quality and energy efficient process

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Abstract

The cement industry is estimated to emit 8% of global CO_2 emissions. With more than 60% of this coming from the calcination of limestone as part of the process required to make clinker, replacing clinker with a low-carbon (i.e., low limestone) supplementary cementitious material (SCM) such as activated clay presents a viable solution to the industry's environmental impact. In line with its MissionZero objective to enable zero-carbon cement production by 2030, FLSmidth has developed a low-energy, low-emissions clay Gas Suspension Calciner process. As a result, high clinker substitution within the cement standards can achieve 40% reduction in power consumption, a >30% reduction in fuel use and a >40% reduction in CO_2 emissions compared to the same cement quality/properties as a standard OPC. It is also projected that there will be a significant decline in other alternates like slag availability in future, hence the usage of alternate such as activated clay is imperative.

Keywords: Clay activation, Clay calciner, SCM, Color control

1 Introduction

The use of calcined clay as an SCM is not new, having been made in rotary kilns for a few decades now. But while the benefits of using calcined clay as a clinker replacement were broadly understood, (e.g. energy savings, emissions reduction, and cost savings compared to clinker production) a number of obstacles stood in the way of wider usage. This included issues such market acceptance of blended cements in many regions as well as a lack of economic drivers for sustainability and CO_2 emissions reductions like we see today.

In the early part of this century, climate change and the problem of CO_2 emissions rose higher on the global agenda. Pressure increased on the cement industry to tackle its emissions problem, with emphasis on reducing the clinker factor through the use of

SCMs. As a material that is both globally available and readily accessible, with proven applications worldwide, calcined clay was targeted as a highly suitable SCM. In addition, cement standards today allow for higher substitution rates while still achieving equal to better performance.

With the emergence of calcined clay gaining wider market acceptance, FLSmidth decided to review the kiln technology in use at the time, with a view to modernizing calcined clay production. The result was a technological leap similar to that which occurred when the cement industry modernized from long wet and long dry kilns to more efficient preheaters and flash calciners. FLSmidth drew on its experience with preheater/calciner technology in the alumina industry and developed a flash calciner system capable of activating clay that is more homogeneous with higher quality, a lower energy consumption, lower emission, and reliable color control.

2 A credible alternative

This flash calcination system was introduced to the market approximately 10 years ago. Despite its proven ability to meet market needs, the cost and carbon pressures on cement producers did not yet exist to drive demand. Conventional cement mixes were widely accepted and relatively cheap to make. Though there was talk of change, there was not yet a demand for it. Fast forward 10 years, however, and market conditions have changed significantly. The declining availability of other SCMs, such as fly ash, coupled with the wider use of carbon taxes and credits and greater political will – both in the realm of actual politics, and in boardrooms across the world – have intensified the need for sustainable cement solutions. From this standpoint, calcined clay is a smart investment, and as a result investment in calcined clay projects has taken off.

2.1 Sourcing the right materials

In order for cement producers to move forward with such an investment, the first step is to ensure a viable clay source. Despite being widely available, not all clays are suitable for use as SCMs. In fact, clay is a collective term for a number of different alumina-silica containing minerals – some of which can be calcined to develop the necessary strength, while others cannot.

The best clay mineral for strength development is kaolinite, a so-called 1:1 clay, meaning it has one layer of silica for every layer of alumina in the mineral structure. There are also some 2:1 clays (two silica layers for every alumina layer), which can also generate strength, but to a lesser degree than kaolinite. Studies to determine a ‘good’ clay look at:

- Silicon dioxide, aluminum oxide and iron oxide content via an XRF (X-ray Fluorescence) analysis
- Mineral content via an XRD (X-ray Diffraction) analysis
- Thermal analysis to determine temperature where the clay is activated
- Rheology and strength development of activated clay in conjunction with cement and limestone.
- Emissions evaluation

FLSmidth can carry out these studies at our laboratory in Dania, Denmark, which includes lab and pilot scale installations for SCM processing. This gives cement producers peace of mind that both their materials and system solution offer the essential capabilities for commercial use. As well as determining suitability, this comprehensive testing also helps confirm in what proportion the clinker, calcined clay, limestone, water and potential use of super plasticizers can be utilized in the cement, as well as early strength optimization.

Emissions testing can be especially critical and is sometimes overlooked by producers studying potential clay sources. Emissions creation from clay production does not behave in the same way as for cement due to its low carbonate content. For example, even a small amount of sulfur in the fuel, or in the clay itself, can lead to significant sulfur emissions, which can be very costly to deal with. In addition to SO_2, other emissions that could be potentially significant and require additional abatement equipment or solutions due to the clay and/or fuel used include CO, TOC, NOx, HCl and HF.

FLSmidth's proprietary flash calcination process (shown in Figure 1) is a complete system that can be integrated into an existing cement plant or established as a standalone process. It comprises materials handling and storage, crushing and drying, the pyroprocess, filters and fans.

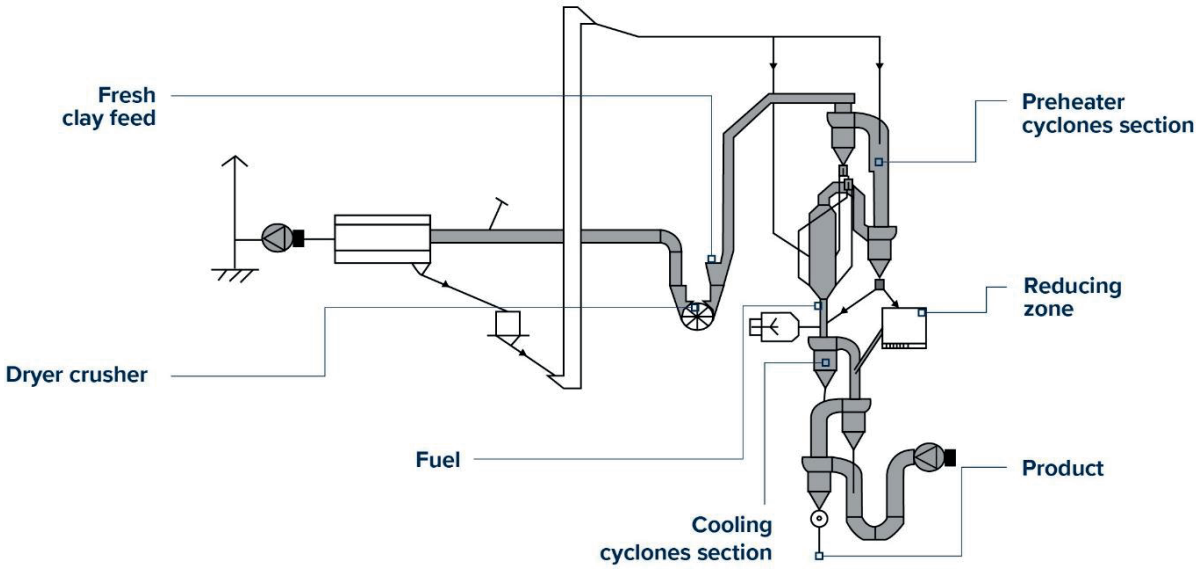

Figure 1. Standard FLSmidth calcined clay system (patent pending)

2.2 Dryer crusher

In the FLSmidth system, an ET dryer crusher (hammer mill type) is used for drying and crushing/milling of the wet clay in one integrated process. The wet clay feed is dosed via a box feeder with variable speed and conveyed to the dryer crusher. Seasonable moisture variations are easily handled by the dryer crusher and the upstream storage and box feeder is capable of handling very sticky and difficult to handle clay. The dryer crusher utilizes waste gas from

the preheater/calciner to simultaneously dry the wet clay feed to less than 1% free moisture while reducing the particle size similarly to that seen for a typical cement raw mix. The dried and ground clay is air swept to a filter after the dryer crusher, for collection of the feed clay to an intermediate bin. The intermediate dry clay bin provides a buffer to stabilize the feed to the clay calciner, while also allowing the ability to do routine maintenance on the raw clay storage and feeding equipment.

2.3 Preheater and calciner

After the crusher dryer, material is fed to a single or a multiple stage preheater/ calciner where the clay is preheated and calcination takes place. Traditional and/or alternative fuel (up to 100%) is fired in the calciner to perform the clay calcination with an external air heater supplied for start-up or supplemental heat as needed.

The bottom cyclone of the preheater separates the calcined clay from the gas stream. The calcining temperature is flexible depending on the nature of the clay and is tightly controlled via an automatic control loop that adjusts the fuel firing rate to maintain a constant bottom stage exit gas temperature. This provides consistent calcination without under or over burning the clay, resulting in uniform product quality and emission control. Furthermore, because the stable process delivers a highly consistent product, it is expected that you can substitute more clinker as compared to calcined clay produced in a rotary kiln.

2.4 Color control, cooling, and heat recuperation

After the calcined clay is collected in the bottom stage, it is transported to the reducing zone. Most raw clays are already off color but will also oxidize during high temperature activation in the presence of oxygen, resulting in a reddish product. The color change depends mainly on the iron content in the raw clay.

To maintain market requirements, a grey color is required for the finished product. To achieve this, a reduction agent (typically the main fuel) is added in an oxygen depleted zone to reduce the iron from the reddish Fe+3 form to a Fe+2 form (magnetite), which is grey in color. Considering the iron content as well as the reduction agent type and quantity, the hot product color can be fully controllable as seen in Figure 2 below (A or B to H to K). To preserve the desired product color, cooler designs have previously depended on rapid quench by water or inert cooling resulting in significant losses in heat recuperation. The latest design is based on quench cooling in ambient air with a series or cyclones to a final product temperature range of 60 – 100°C above ambient. This allows high quality heat to be recuperated as a preheated oxygen source for the combustion or clay drying, which minimizes fuel consumption and CO_2 emissions. Despite cooling in oxidizing conditions, the color remains fully controllable (C to G in Figure 2) due to the fast temperature reduction. Excess reduction agent is drafted back to the calciner ensuring no energy loss and maximum heat recuperation for the calciner system.

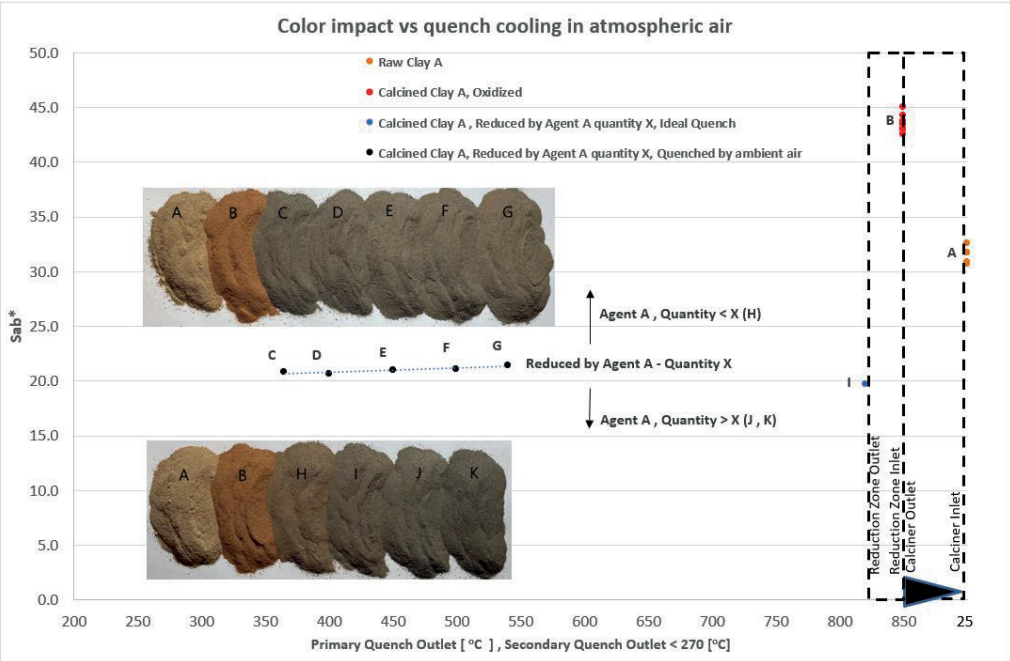

Figure 2. Color impact versus quench in atmospheric air

2.5 Catering to high-moisture clays

For high-moisture clays, the system can be redesigned so that the quench cooling cyclones are in parallel to the calciner and preheater, instead of in series. The high-quality heat is then used in the drying application and the preheater and calciner. The design keeps CAPEX to the bare minimum while also ensuring overall lower OPEX and CO_2 emission. This alternative system design can be seen below in Figure 3.

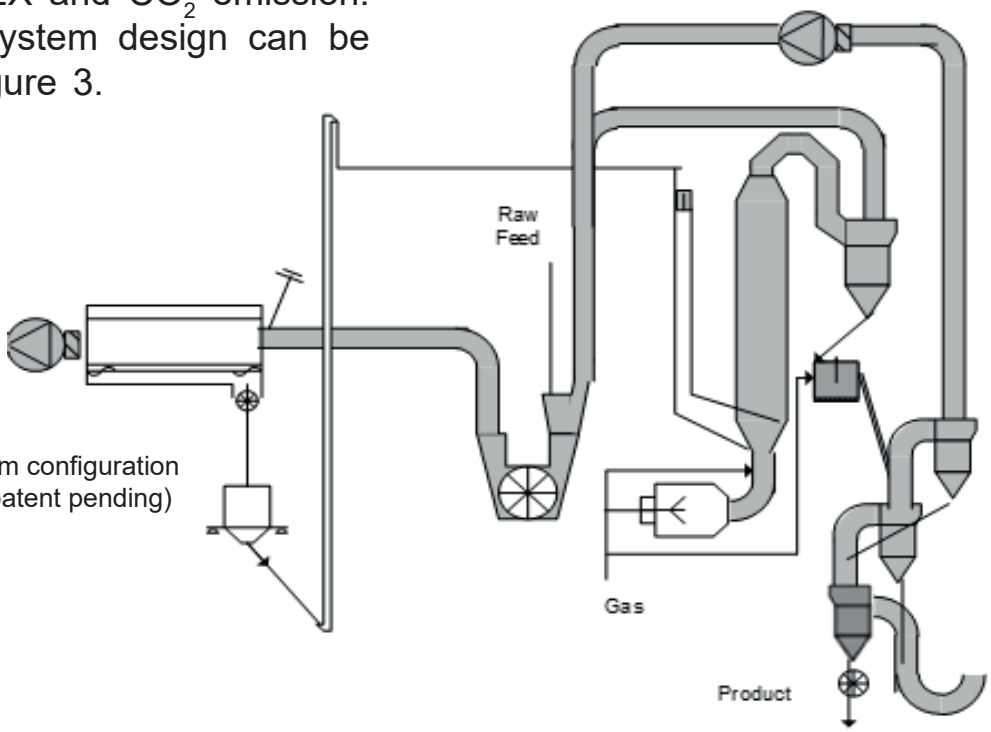

Figure 3. Alternate system configuration for high clay moisture (patent pending)

2.6 Swift Return on Investment

Calcining clay is more energy efficient than producing clinker. Because calcined clay requires a much lower temperature (i.e. 750 – 850˚C instead of 1400 – 1500˚C) and has a lower heat of reaction than clinker, less fuel is required. Similarly, the power costs for grinding and handling is much lower. Table 1 shows typical values for a direct comparison between traditional OPC (95% clinker and 5% gypsum) and LC350 (50% clinker, 30% calcined clay, 15% limestone, and 5% gypsum). Exact values will depend on the clay composition, feed moisture, and fuel characteristics.

The bottom-line benefit revealed in Table 1 is > 30% decrease in fuel consumption, a 40% decrease in power consumption, and > 40% decrease in CO_2– all while maintaining cement quality, color and strength. These benefits could go a long way to helping producers achieve both their productivity and sustainability targets or provide low capital investment to increase capacity. The technology is proven and available now, enabling cement producers to maintain product quality with a much-reduced environmental impact, a low ROI and low OPEX. With a stationary system the maintenance cost is kept to a bare minimum and ensuring high annual operating time without need for long annual stoppage as with rotary kilns.

Table 1. Comparison between OPC and LC350 for modern plants. Benefits can be even higher for older lines.

	OPC	LC^{3}50
Fuel consumption kcal/ kg	684	468*
Power consumption kWh/t	85	51
Kg CO_2/kg cement:		
Raw material	0.50	0.25**
Fuel***	0.26	0.18
Power	0.06	0.04
Total CO_2 emission kg/kg	0.82	0.47
Cement capacity Index	100	100 - 190

* Based on 15% moisture and 10% LOI in the raw clay
** Excludes carbonate and organic content in raw clay (traces may be expected)
*** Excludes biogenic CO_2

2.7 Impact of clay feed moisture

As Figure 4 below shows, fuel consumption increases along with the clay feed moisture content, due to the extra heat needed for drying. This is an important factor, as the calciner and cyclone sizing is based on gas velocity for a given window of production level. It is therefore important to design the equipment for the nominal clay moisture and not the worst-case clay moisture so that the equipment is not oversized for normal operation through most of the year. The worst-case clay moisture is relevant for designing the storage and feeding system to the dryer crusher to ensure that equipment will be reliable all year round.

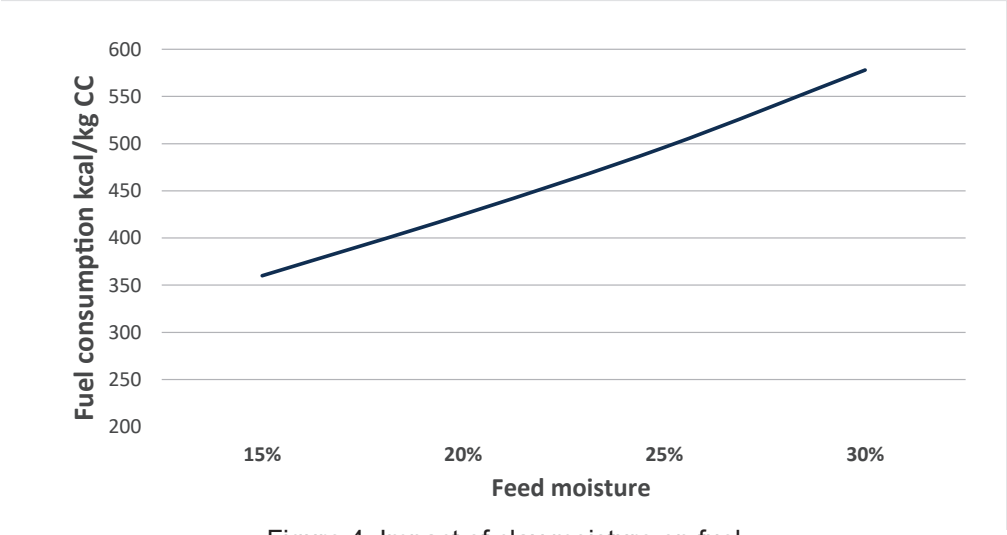

Figure 4. Impact of clay moisture on fuel consumption (Basis: 10% clay feed LOI)

2.8 Final cement strength

Figure 5 represents the strength comparison between different SCMs and OPC. As per Professor Karen Scrivener, FREng, EPFL, Switzerland, LC3-50 produced with a clay having a kaolin content > 40% displays a development of slower initial strength but on par with OPC and also a better final strength. As shown in the graph, the performance of other SCMs is relatively inferior. Flyash, slag and flyash mixed with limestone or slag mixed with limestone develops much slower strength. Additionally, ASR and chloride resistance is noted to be better in LC3

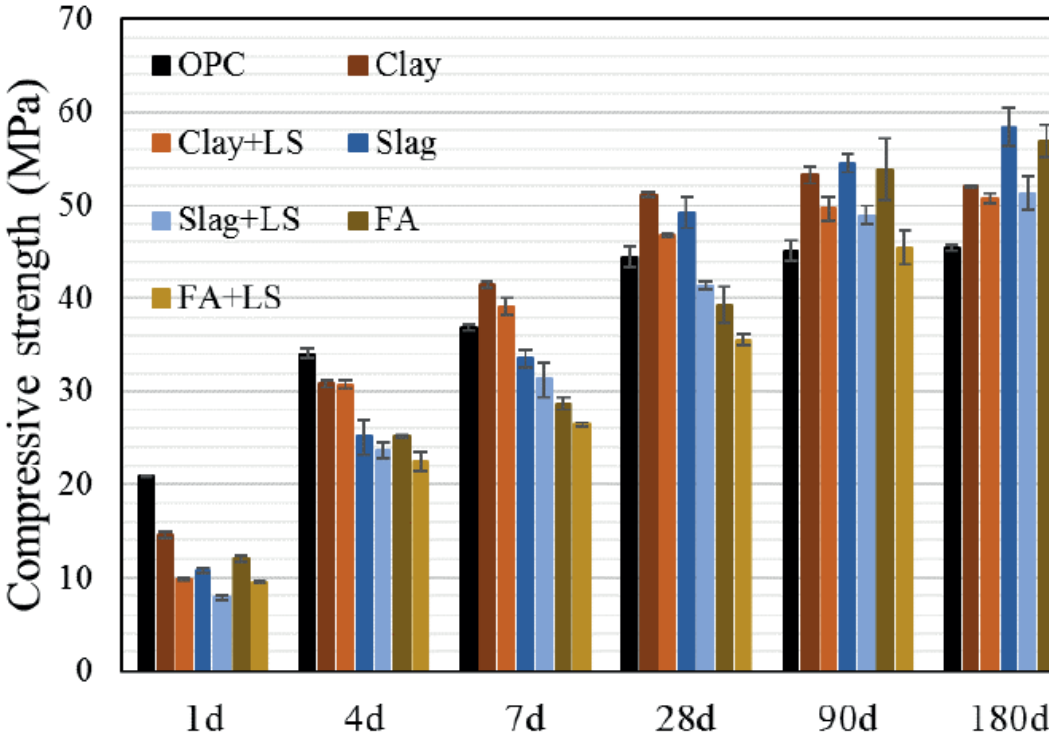

Figure 5. Strength comparison of different SCMs and OPC

2.9 Conclusion

The patent pending flash calciner system for clay calcination draws on FLSmidth's long history of preheater and calciner design, experience with alumina calciners in the mining industry, and extensive R&D at our laboratory and pilot facility in Denmark. Offering significant opportunities to reduce carbon emissions along with enhanced productivity, this technology supports the cement industry's ambition to achieve Net Zero carbon dioxide emissions by the year 2050 and is part of FLSmidth's ambitious MissionZero program, which aims to enable zero carbon cement production by 2030.

Already, cement producers are taking advantage of these benefits and investing in clay calcination systems to complement existing production streams. As an existing and proven material that requires no compromise from end users, calcined clay is set to become an important contributor not just to cement manufacture and construction, but to the global mission to reduce greenhouse gas emissions.


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العدد 90
ديسمبر / كانون الأول 2022

رئيس التحرير- الأمين العام

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مدير التحرير

سها منير كنعان

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المحتويات

الموضوعات

مجلة عالم الإسمنت ومواد البناء

جدول موضوعات المجلة لعام 2023

العدد	الموضوعات	المناسبات
مارس/آذار 2023 (العدد رقم 91)	* المعالجة الحرارية * التحكم في العمليات والتحسين نحو الأمثل * هندسة عمليات الإسمنت * أفران الإسمنت * معالجة النفايات الخطرة ومراحل ما قبل معالجتها * معالجة غازات المداخن * التحول الرقمي * الرقمنة في صناعة الإسمنت * الحراقات وعمليات الحرق * تطوير المشاريع * التحديث والأتمتة * تحليل الغازات * الاختبار والتحليل * معدات المختبرات	
يونيو/حزيران 2023 (العدد رقم 92)	* التعبئة والتغليف * أنظمة التحميل / التفريغ والتخزين * حلول النقل * تكنولوجيا التغذية * سيور الرافعات الدلوية * مناولة المواد في مصانع الإسمنت والمحاجر والمحطات والموانئ * القباب والصوامع والنقل * الحماية من التآكل * التروس والمحركات والتزييت * أنظمة الحماية من الحريق * إجراءات الصيانة * الحراريات * تأهيل المحاجر * تنظيف الصوامع * المرشحات وإزالة الغبار	
سبتمبر/أيلول 2023 (العدد رقم 93)	* المبردات * المراوح * مدافع الهواء * الصحة والسلامة المهنية * تكنولوجيا الطحن * الطواحين العمودية * زيادة إنتاج مطحنة الإسمنت * التكسير * مساعدات الطحن والطحن * استعادة الحرارة المفقودة * التصوير الحراري * إعادة التدوير الحراري	المؤتمر والمعرض العربي الدولي السادس والعشرون لصناعة الإسمنت: الرياض / المملكة العربية السعودية نوفمبر / تشرين الثاني 2023

	* طرق معالجة واستخدام غبار الممر الجانبي * الحماية من الانفجار في صوامع تخزين الوقود البديل * أنظمة مناولة الوقود البديل * إنتاج واستخدام الوقود الصلب المستعاد	
ديسمبر/كانون أول 2023 (العدد رقم 94)	* تصنيع الإسمنت الأبيض * الإسمنت المخلوط * الإسمنت متعدد المكونات * إسمنت الخبث * إنتاج الإسمنت الأخضر * خلائط الإسمنت * مضافات الإسمنت * مكونات الإسمنت * كيمياء الإسمنت * الإسمنت الخالي من الكربون * إنتاج الكلنكر منخفض الكربون * المواد الخام لمضافات الإسمنت * إدارة الإمدادات * إنتاج الإسمنت بطاقة منخفضة * توكيد الجودة ومراقبة العمليات في مصانع الإسمنت * توفير تكلفة إنتاج الإسمنت	

آخر موعد لاستلام المقالات أو النصوص الصحفية أو الإعلانات لأعداد عام 2023 هو على النحو التالي :

1. عدد مارس / آذار : **7 مارس / آذار** 2023
2. عدد يونيو / حزيران : **30 مايو / أيار** 2023
3. عدد سبتمبر / أيلول (عدد خاص) : **31 أغسطس / آب** 2023
4. عدد ديسمبر / كانون أول : **5 ديسمبر / كانون أول** 2023

الإعلانات

(بالدولار الأمريكي)

	الإعلان في عدد واحد	الإعلان في عددين	الإعلان في ثلاثة أعداد	الإعلان في أربعة أعداد
غلاف خارجي ملون (يمين أو يسار) A4	1,250	*	*	*
غلاف داخلي ملون (يمين أو يسار) A4	950	*	*	*
صفحة داخلية ملونة A4	750	950	1,250	1,350
نصف صفحة داخلية ملونة A4	450	550	650	750
ربع صفحة داخلية ملونة A4	300	350	400	450
صفحة أسود وأبيض	300	350	400	450

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

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الإمارات العربية المتحدة

"التغير المناخي والبيئة" و"الإمارات للوقود البديل" توقعان مذكرات تفاهم مع 4 مصانع إسمنت لاستخدام الوقود البديل

وقعت وزارة التغير المناخي والبيئة ، وشركة الإمارات للوقود البديل ، في أكتوبر / تشرين الأول الماضي 4 مذكرات تفاهم مع مصانع إسمنت الفجيرة ، وإسمنت جي إس دبليو ، ولافارج الإمارات ، وستار للإسمنت ، لاستخدام الوقود البديل المنتج من محطة معالجة النفايات البلدية الصلبة في إمارة أم القيوين بشكل جزئي لتشغيل عملياتها التصنيعية ، وفي إطار جهود الوزارة لتعزيز مشاركة القطاع الخاص في السعي لتحقيق الحياد المناخي ، وتطبيق معايير الاقتصاد الدائري ، وتعزيز منظومة الإدارة المتكاملة للنفايات .

جدير بالذكر أن مشروع محطة معالجة النفايات البلدية الصلبة وإنتاج الوقود البديل (RDF) في إمارة أم القيوين يعد الأول من نوعه في الدولة ، ويهدف إلى معالجة النفايات البلدية الصلبة المتولدة من إمارتي عجمان وأم القيوين وتحويلها إلى وقود بديل يمكن استخدامه في توفير الطاقة لمصانع الإسمنت في عملياتها التشغيلية .

ويساهم المشروع بشكل كبير في تحويل النفايات البلدية الصلبة عن مكبات النفايات وتحقيق الإدارة المتكاملة للنفايات ودعم أهداف التنمية المستدامة .

المصدر: www.wam.ae

الجزائر

مجمع "لافارج الجزائر" يطلق أول إسمنت أخضر صديق البيئة

أطلق مجمع "لافارج الجزائر" لإنتاج الإسمنت ومقره بلدية عقاز بولاية معسكر ، أول إسمنت أخضر في الجزائر صديق للبيئة .

وهذا الإسمنت الجديد الذي يحمل العلامة التجارية "شامل" يساهم بخفض انبعاثات ثاني أوكسيد الكربون بنسبة 40% مقارنة بالإسمنت التقليدي . كما أن هذا المنتوج الجديد الذي يعتمد إنتاجه على تقنية تم تطويرها بواسطة مخبر تطوير البناء في الرويبة "الجزائر العاصمة" يساهم في بناء المنازل والبنية التحتية .

وتم الوصول إلى هذا الإسمنت الجديد بعد تجارب اعتمدت على تقنيات عالية دامت لمدة سنتين . كما تسمح هذه التكنولوجيا التي تعتمد على إدماج طرائق صناعية مبتكرة بالحفاظ على الموارد المحلية "الطين والحديد" .

ويتوقع مجمع "لافارج الجزائر" تصدير حوالي 3 ملايين طن من مختلف منتجاته مع نهاية عام 2022 انطلاقاً من موانئ وهران ومستغانم وجيجل و نابة وسكيكدة .

وأعلنت مؤسسة الإسمنت "لافارج الجزائر" التابعة للمجمع السويسري هولسيم ، سابقاً أنه ولأول مرة تمكنت من تجاوز عتبة المليوني طن من صادرات الإسمنت والكلنكر . وقد حققت المؤسسة الكمية في أقل من 5 سنوات منذ بداية تصدير الإسمنت انطلاقاً من الجزائر . بالمقابل سجلت سنة 2021 تطوراً فاق 100% مقارنة بالسنة السابقة التي بلغت الصادرات خلالها 1.2 مليون طن .

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المملكة العربية السعودية

تراجع نسبته 65% في صادرات السعودية من الإسمنت والكلنكر خلال 8 أشهر

بلغت صادرات المملكة العربية السعودية من الإسمنت والكلنكر منذ بداية 2022 وحتى نهاية أغسطس / آب 662 ألف طن ، مقارنة بنحو 1.9 مليون طن خلال نفس الفترة في 2021 ، بتراجع نسبته 65% .

وبلغ حجم استيراد الإسمنت والكلنكر خلال الأشهر الـ8 الأولى من عام 2022 نحو 135 ألف طن ، مقابل 118 ألف طن للفترة نفسها من عام 2021 .

وكشفت وزارة التجارة أن عدد التراخيص المعتمدة لتصدير الإسمنت بلغت 112 رخصة منذ بدء السماح بالتصدير .

وأعلنت الوزارة ، أن إجمالي الرخص المصدرة منذ بداية 2022 حتى نهاية يوليو / تموز الماضي بلغ 10 رخص لتصدير الإسمنت ، بعد استيفاء الشروط والمتطلبات المحددة وفقاً للضوابط التنظيمية للجنة التموين الوزارية ، وهي لجنة وزارية مشكلة من وزارات "التجارة والاستثمار ، والمالية ، والطاقة ، والصناعة والثروة المعدنية ، والبيئة ، والمياه والزراعة" .

قال الدكتور بدر جوهر ، رئيس اللجنة الوطنية لشركات الإسمنت في اتحاد الغرف السعودية ، إن مبيعات الإسمنت في والسوق المحلية بلغت منذ بداية 2022 وحتى نهاية أغسطس / آب نحو 32.8 مليون طن ، بانخفاض 4.3% عن الفترة نفسها من العام السابق ؛ بسبب تراجع الطلب على الإسمنت .

وأوضح جوهر أن حجم إنتاج شركات الإسمنت منذ بداية عام 2022 حتى أغسطس / آب بلغ 37.9 مليون طن .

وأضاف رئيس اللجنة الوطنية بأن الطاقة القصوى لشركات الإسمنت البالغ عددها 17 شركة تصل إلى 80 مليون طن إسمنت سنوياً ، إلا أن شركات الإسمنت تعمل ما بين 60 - 70 % من طاقتها الإنتاجية ، مبيناً أن حجم المخزون من الكلنكر حالياً 35.8 مليون طن ، هو ما يعادل مبيعات 9 أشهر .

المصدر: www.aswaqinformation.com

ارتفاع مبيعات الإسمنت في العربية السعودية مع بدء مشاريع البناء الضخمة

بلغت مبيعات الإسمنت المحلية في المملكة العربية السعودية 1.45 مليون طن خلال الربع الثالث من عام 2022 ، مرتفعة من 1.43 مليون طن في الفترة المماثلة من العام السابق .

ومن المتوقع أن تؤدي زيادة أنشطة البناء بسبب شركة البحر الأحمر للتطوير وأمالا وغيرها من المشاريع التنموية في المملكة العربية السعودية مثل نيوم والقدية إلى تعافي صناعة الإسمنت بعد تضاؤل الطلب في عام 2021 وأوائل عام 2022 بسبب الوباء .

المصدر: https://khaleejtalks.com

إسمنت القصيم" توقع مذكرة تفاهم غير ملزمة لغرض الاستحواذ على جميع الأسهم المصدرة في "إسمنت حائل"

وقعت شركة "إسمنت القصيم" مذكرة تفاهم غير ملزمة مع شركة "إسمنت حائل" ، والتي بموجبها اتفقت الشركتان على بدء المناقشات بشأن صفقة مبادلة أوراق مالية تستحوذ بموجبها "إسمنت القصيم" على جميع الأسهم المصدرة في "إسمنت حائل" .

وقالت الشركتان أنه مع مراعاة استكمال دراسات التقييم المالي بنجاح وما قد تنتهي إليه دراسات العناية المهنية اللازمة ذات الصلة ، اتفقت الشركتان على المُضي قدماً بالمناقشات في سياق معامل مبادلة غير ملزم سيحصل بموجبه مساهمو إسمنت حائل على عدد (0.1933) سهم جديد في إسمنت القصيم مقابل كل سهم يملكونه في إسمنت حائل .

وبينتا أنه في حال إتمام الصفقة المحتملة بناءً على معامل المبادلة ، فسيبلغ إجمالي العوض الذي ستقوم إسمنت القصيم بدفعه لمساهمي إسمنت حائل عدد 18.92 مليون سهم جديد تقريباً في إسمنت القصيم .

المصدر: www.argaam.com

إسمنت اليمامة" توقع عقد مشروع نقل خط الإنتاج رقم 7 من المصنع القديم إلى الجديد بتكلفة 830 مليون ريال

وقعت شركة "إسمنت اليمامة" مع شركة Sinoma Overseas Development Co. Ltd الصينية ، عقد مشروع نقل الخط السابع من المصنع القديم إلى المصنع الجديد ، بتكلفة تقديرية تبلغ 830 مليون ريال . وسيتم البدء في إنشاء المشروع في الربع الأول من العام 2023 ، ويتوقع الانتهاء من إنشائه في النصف الثاني من العام 2025 .

وكان مجلس إدارة شركة إسمنت اليمامة قد قرر في أبريل / نيسان 2021 نقل وتركيب الخط السابع من المصنع القديم في جنوب مدينة الرياض إلى موقع المصنع الجديد في الحلال الشمالية بمحافظة الخرج التابعة لمنطقة الرياض .

المصدر: www.argaam.com

"الإسمنت العربية" تعلن عدم قدرة مقاول مشروع إنشاء طواحين إسمنت جديدة في مصنع رابغ على إكماله وضرورة إشراك طرف ثالث

أعلنت شركة "الإسمنت العربية"، استلامها إفادة من المقاول "شركة الصين الوطنية لمواد البناء CNBM " تفيد بعدم مقدرته على إكمال مشروع إنشاء طواحين أسمنت جديدة في مصنعها برابغ .

وبينت أنها تقوم بتقييم الوضع العام للمشروع فنياً وتعاقدياً وذلك لاختيار الطريقة الأمثل لاستكمال الأعمال المتبقية منه وذلك بعد تقييم العروض الفنية والتجارية من الجهة المصنعة للمعدات الرئيسية.

وقالت الشركة إن نسبة الإنجاز المتحقق 99.53%، مشيرة إلى أنها ستحتفظ بكامل الضمانات المالية التعاقدية من المقاول مقابل أعمال المشروع وذلك حتى اكتمال تنفيذه. وأوضحت أن سبب التأخر هو عدم التزام المقاول بالجدول الزمني حيث أبلغها بعدم القدرة على إكمال المشروع وضرورة إشراك طرف ثالث.

وكانت "إسمنت العربية" قد وقعت في أبريل / نيسان 2015 عقداً مع شركة "CNBM" الصينية لهندسة وتوريد وإنشاء طواحين الإسمنت بكامل معداتها الميكانيكية والكهربائية لخطها الجديد برابغ ، وكذلك التصميم والإشراف على الأعمال المدنية والهياكل المعدنية والتركيبات الميكانيكية والكهربائية واختبارات بدء التشغيل ، بتكلفة قدرها 362 مليون ريال .

وكانت الشركة قد توقعت تأخر التشغيل التجاري لمشروع الطواحين الجديدة في مصنعها برابغ حتى الربع الرابع 2022 .

المصدر: أرقام

بيع 1.4 مليون طن من الكربون خلال "مستقبل الاستثمار" في المزاد الأكبر من نوعه على مستوى العالم

أعلن صندوق الاستثمارات العامة في مزاد مبادرة السوق الطوعية لتداول الائتمان الكربوني في مؤتمر مبادرة مستقبل الاستثمار خلال دورته السادسة بالعاصمة الرياض نجاح تداول 1.4 مليون طن من الائتمان الكربوني في المزاد الأكبر من نوعه على مستوى العالم .

وقامت كل من أرامكو السعودية وشركة العليان المالية ، وشركة التعدين العربية السعودية (معادن) بشراء أكبر عدد من وحدات الائتمان الكربوني في المزاد . وشملت قائمة المشاركين الآخرين شركة إسمنت ينبع .

وتتوافق شهادات الائتمان الكربوني المقدمة خلال المزاد مع معايير «كورسيا» المسجلة في برنامج «فيرا» التي تسهم في تمكين الشركات من المساهمة في الوصول إلى الحياد الصفري ، بالإضافة إلى ضمان شراء أرصدة الكربون لتخفيض الانبعاثات الكربونية في سلاسل القيمة .

المصدر: https://aawsat.com

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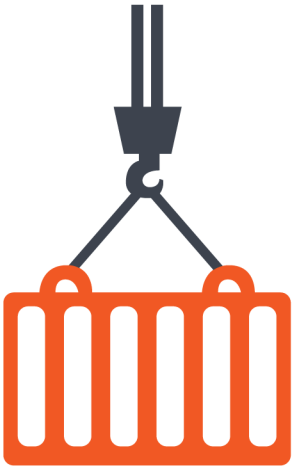

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ليبيا

افتتاح مصنع مجموعة الخليج للإسمنت - زليتن

بدأت شركة إسمنت زليتن التابعة لمجموعة الخليج للإسمنت الإنتاج في مصنع إسمنتن زليتن في أواخر سبتمبر / أيلول 2022 . وسوف يتم تسويق المنتج تحت علامة "شركة إسمنت زليتن" طبقاً للمواصفات القياسية الليبية رقم 340 / 2009 م وبرتبة CEM 42.5 N

جمهورية مصر العربية

مصر تضاعف أسعار بيع الغاز لمصانع الإسمنت 109%

أصدر رئيس الوزراء المصري قراراً بمضاعفة سعر بيع الغاز الطبيعي المورد لصناعة الإسمنت ، وذلك من 5.75 دولارات إلى 12 دولاراً للمليون وحدة حرارية ، أي بزيادة تبلغ 109% .

وتُنذر الأسعار الجديدة للغاز بقفزة في أسعار بيع الإسمنت في السوق المصرية ، والذي يراوح سعره حالياً ما بين 1375 جنيهاً و1600 جنيه للطن . وحدد القرار سعر بيع الغاز الطبيعي المورد لصناعة البتروكيماويات (إنتاج خليط الإيثان والبروبان) بـ4.5 دولارات بحد أدنى للمليون وحدة حرارية ، وسعر البيع لباقي الصناعات البتروكيميائية بواقع 5.75 دولارات للمليون وحدة حرارية .

كما حدد سعر بيع الغاز المورد لصناعة الطوب بواقع 110 جنيهات للمليون وحدة حرارية .

وكانت مصر قد رفعت أسعار بيع الغاز للأنشطة الصناعية في 1 نوفمبر / تشرين الثاني 2021 من 4.5 دولارات إلى 5.75 دولارات للمليون وحدة حرارية لمصانع الحديد والصلب والإسمنت والأسمدة والبتروكيميائيات ، وإلى 4.75 دولارات لبقية الأنشطة الصناعية .

المصدر: www.alaraby.co.uk

"العربية للإسمنت" توقع عقد شراء جديد للطاقة الشمسية مع "أمارنكو"

وقعت الشركة العربية للإسمنت تعديلاً في عقدها مع شركة أمارنكو سولاريز إيجيبت الذي تم التوقيع عليه للمرة الأولى عام 2019 ، لإقامة محطة لتوليد الطاقة الشمسية في مصنع الشركة بمدينة السويس .

وتصل قدرة مشروع الطاقة الشمسية في مصنع العربية للإسمنت 20.6 ميجاوات بعد أن تم تشغيل المرحلة الأولى منذ 2019 بقدرات توليد تصل إلى 7441 كيلووات أقصى ، كما يصل إجمالي الطاقة المولدة إلى 1000 ميجاوات شهرياً ، بما يعادل 3% من إجمالي استهلاك العربية للإسمنت من الكهرباء .

وتصل إجمالي وفورات انبعاثات ثاني أكسيد الكربون من المرحلة الثانية وحدها إلى حوالي 13 ألف طن سنوياً ، بالإضافة للوفورات الحالية من الانبعاثات الكربونية بالمرحلة الأولى والتي تصل لحوالي 5500 طن كل عام .

ومن المتوقع بدء التشغيل التجريبي والفعلي للمرحلة الثانية في سبتمبر 2023 .

المصدر: www.alborsaanews.com

السويس للإسمنت المصرية تتعاقد على كهرباء محطة طاقة شمسية

وقّعت مجموعة السويس للإسمنت في مصر (إحدى الشركات التابعة لمجموعة هايدلبرج سيمنت الألمانية) اتفاقاً لشراء الكهرباء المولدة من الطاقة الشمسية من شركة إنترو باور اند يوتيليتيز . وستقوم الأخيرة بتدشين محطة لتوليد الكهرباء من الطاقة الشمسية بمصنع إسمنت السويس .

وتستهدف السويس للإسمنت خفض تكلفة الكهرباء اللازمة للعمليات التشغيلية ، إضافة إلى خفض انبعاثات الكربون .

وتبلغ قدرة محطة الطاقة الشمسية 20 ميغاواط ، ما يمثّل 30% من احتياجات مصنع السويس الكهربائية .

ومن المقرر أن يبدأ إنشاء محطة الطاقة الشمسية التي تولّد كهرباء لصالح مجموعة شركات السويس للإسمنت في عام 2023 وأن تدخل حيز التشغيل في النصف الأول من العام ، مع توقّع انتهاء المشروع في غضون عامين .

المصدر: https://attaqa.net

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جوال – واتس اب: 00963969019984

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