International
Cement review
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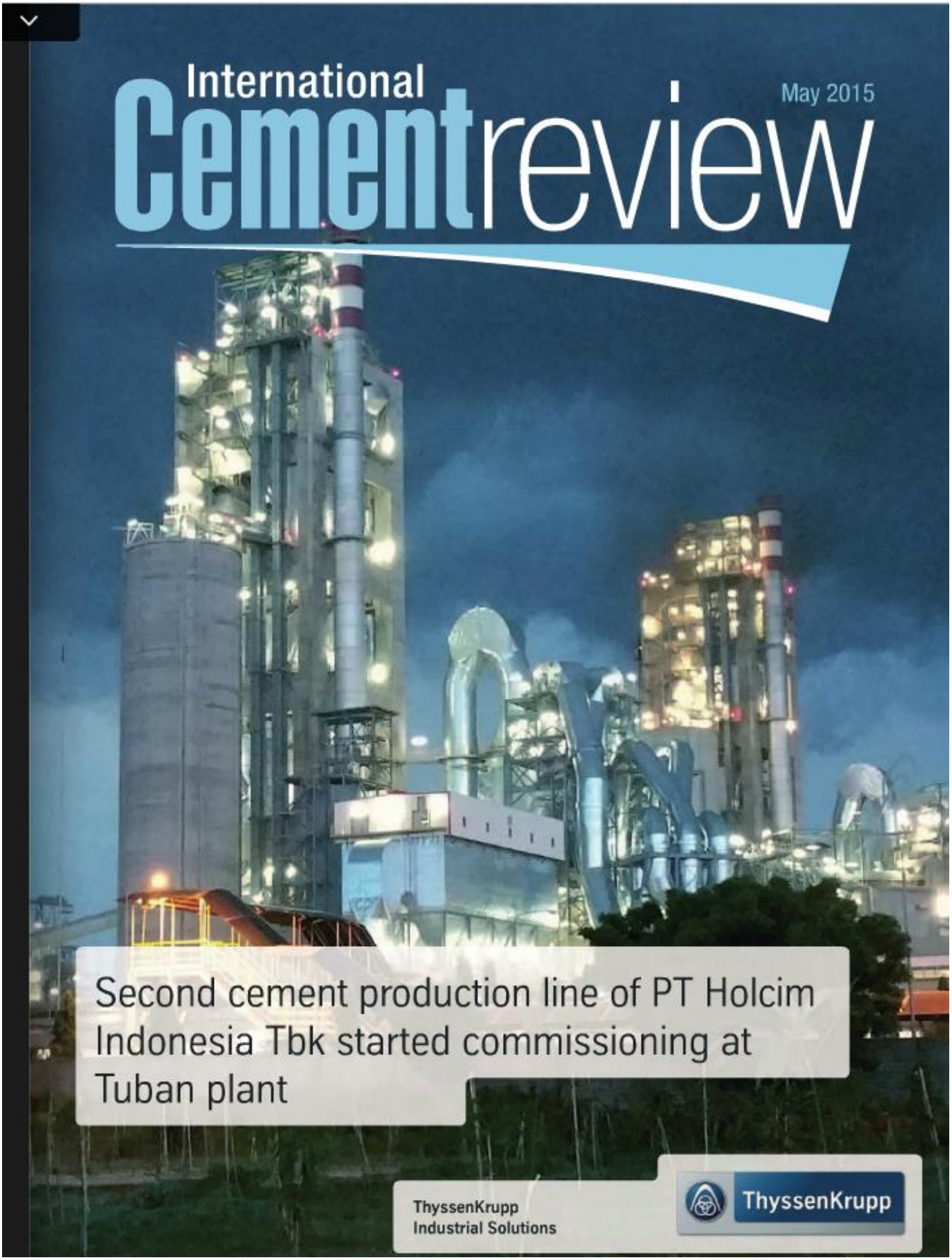

Second cement production line of PT Holcim Indonesia Tbk started commissioning at Tuban plant

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Milling on the move

by Pablo Suarez,
IMSACOL SAS, Colombia

Changes in legislation that allow a wider range of composite cements, expansion of localised production to meet market demand and a need to reduce emissions have driven the requirement for smaller-scale, more mobile cement grinding units that can be quickly and if necessary, temporarily, employed at a wide range of locations across the world.

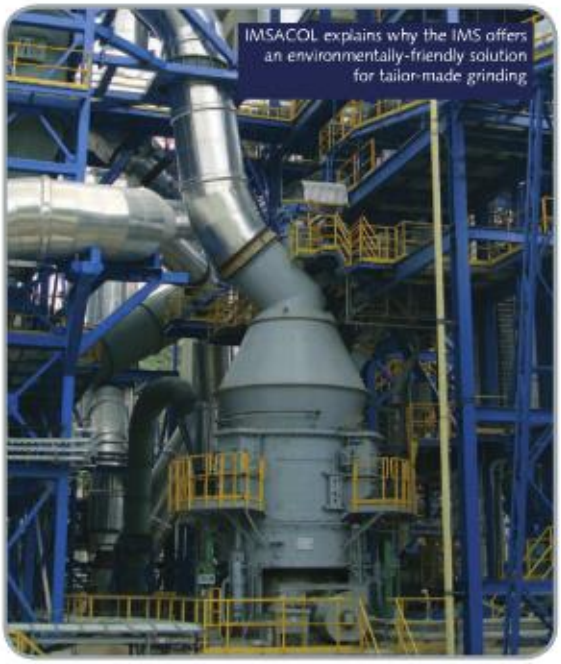
To enable cement manufacturers to produce a wide range of tailor-made cements virtually anywhere in the world, Colombia-based IMSACOL has developed the portable Integrated Milling System (IMS). Featuring state-of-the-art technology, the grinding unit can be adapted according to the raw materials available near the plant site as well as incorporate the use of pozzolanic materials such as flyash, blastfurnace slag and limestone. In addition, the option exists to employ alternative fuels for hot gas generation depending on availability.

Plant lay-out

An IMS grinding plant with a capacity of 0.145Mta producing a combination of cement types I and II mainly consists of:

- storage and dosing hoppers for clinker, gypsum, limestone and pozzolanic materials
- latest-generation vertical roller mill
- conveyor systems (bucket elevators and screw conveyors)
- pollution control system (bag filters), using modern technology to minimise emissions
- 150t cement and additives storage
- 30tph packing line
- automation and control system.

All these components are assembled in standard container-sized structures for easy transport and reassembly.



IMSACOL explains why the IMS offers an environmentally-friendly solution for tailor-made grinding

The Integrated Milling System includes a Gebr Pfeiffer MPS mill that can operate as a swing mill

Swing mill

For the grinding process IMSACOL developed in collaboration with Gebr Pfeiffer the concept of a dual-purpose mill that fits the size and capacity required for this project. The selected Gebr Pfeiffer mill, which is able to work as a 'swing mill', has an automatic control system to alternate the hydraulic pressure of milling rods, enabling it to adapt to a different material and reducing change over time.

This Gebr Pfeiffer MPS mill offers several benefits when operating as a swing mill including:

- the ability to grind additive materials up to 6000Blaine.
- the ability to operate in optimised conditions for both materials without loss from either too much or little air flow since the difference in air required to carry both additives materials and ground cement material through the mill is minimal
- no mechanical changes needed when switching from additives to clinker grinding and vice versa
- no changes required to mill table speed
- the same parallel position of roller and table applies for different material depths between roller and table.

Dosing system

The raw materials are stored in a yard and are dosed to the system by four hoppers with Schenck dosing conveyors.

Blending

Four transportable 150t silos store the ground materials separately to feed the advanced Coriolis blending system. The latter can feed either the packing system or the bulk truck loading system.

Packing

The plant is provided with a two-nozzle manual packer able to pack up to 30tph. The bagged cement can be delivered to trucks by a belt conveyor.

The Integrated Milling System enables quick deployment of grinding facilities

Emissions control

The recovery of ground materials and emissions control is accomplished with a pulse jet bag filter to ensure low emissions, down to 10mg/m³.

This filter has been designed to fit standard container-size structures.

A green solution

The IMS offers an environmentally-friendly solution to tailor-made grinding for several reasons:

Energy efficiency

Vertical mill's power consumption is less than balls mills, the motor will save between 30-60 per cent of energy and the final complete installation will save between 30-40 per cent of total energy consumption compared to a ball mill installation, resulting in optimised energy consumption and emissions per unit of production, reducing production costs and improving competitiveness.

With lower power consumption there is less pressure on the regional power generation system, resulting in a positive environmental impact, especially in terms of thermal power generation.

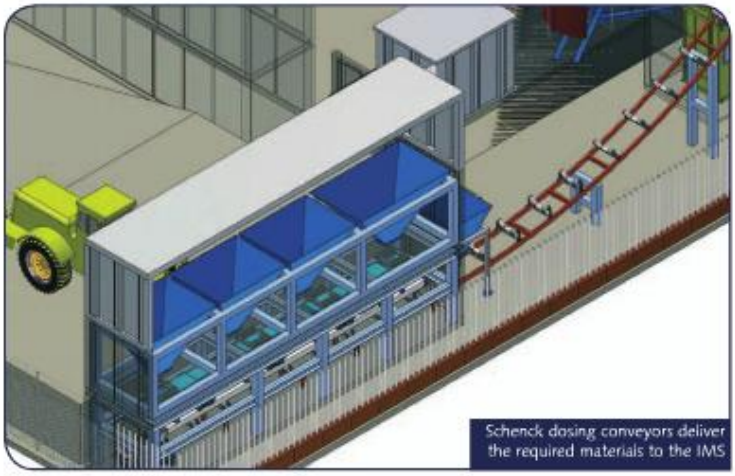
The rational and efficient use of energy resources can produce a product using less energy and generating less environmental pollution

Replacement waste as raw materials

Since clinker production generates between 0.8-1.6t of CO_2 per tonne of clinker, depending on the technology used, a substitution of part of the clinker with waste materials has a positive environmental effect. The benefit is even more marked in countries that use wet-process or other low-efficiency clinker production technologies.

The IMS uses industrial waste such as slag, flyash from thermal plants, ceramic and brick waste, paper sludge, construction and demolition waste and waste from the nickel industry, which have a composition similar to that of the raw materials for additions with which cement is manufactured and can replace natural raw materials such as clinker, limestone, pozzolan among others, thus reducing the exploitation of natural resources.

The IMS, therefore, enables cement production with a lower clinker ratio without compromising the quality or performance of the final product.



Schenck dosing conveyors deliver the required materials to the IMS

Improved transport and land use

The plant has an easily transportable design using standardised means (platforms, containers, flat-racks ...). The assembly of the modules is fast, as all fixtures are pre-installed within each module. This allows it to work in several different locations throughout its life. The simplicity of the solution leads to an optimisation of material transport and storage within the plant, resulting in lower energy requirements and environmental load.

The surface area optimisation results in better land use, with a used area almost 10 times less than a traditional plant. Production is optimised with modular processes, allowing plant placement close to raw materials sources and/or markets, resulting in a net reduction in transport distances. This reduces the burden on land transport, resulting in lower fossil fuel consumption.

Conclusions

The IMS not only enables the rapid production of a wide range of composite cements that meet specific market requirements, but the plant is designed to lower GHG emissions and reduce its carbon footprint.

In addition, the use of clinker can be optimised through the utilisation of alternative raw and cementitious materials. These alternative options enable the cement producer to lower production costs and optimise investment costs.

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IMS
INTEGRATED MILLING SYSTEM

GRINDING REVOLUTION

- MOBILE (Fully Transportable)
- LOW POWER CONSUMPTION
- GREEN AND ENVIORONMENTALLY FRIENDLY SOLUTION BY UTILIZATION OF ALTERNATIVE RAW MATERIALS
- ABILITY TO SEPARATELY GRIND CLINKER AND ADDITIVES TO DELIVER PRODUCTS TAILORED TO CONSUMER NEEDS
- GRINDING AND DRYING IN SAME INSTALLATION, NEEDED FOOTPRINT ONLY 30 x 40 METER
- FAST AND EASY INSTALLATION
- LOW INVESTMENT COST
- USING STATE OF THE ART WESTERN TECHNOLOGY

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