

MAY 2020

International **Cement**review

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Grinding on the go

As some modular grinding technologies do not incorporate the ability to dry raw materials fed into the process, Colombia-based mini grinding plant supplier IMSACOL developed a grinding solution that enables cement producers to dry raw materials such as pozzolan in a cost-effective, low energy usage grinding operation.

■ by **Eng Pablo Suárez**, IMSACOL, Colombia

Colombia-based supplier of mini grinding plants IMSACOL has identified a series of drawbacks with existing modular grinding plants:

- traditional multi-chamber ball milling has a high energy consumption – this also applies to mills with a high length-diameter (L-D) ratio where initial grinding is carried out by an inefficient ball mill system
- mills with a high L-D ratio can also have mechanical and maintenance issues, resulting in high maintenance requirements for shells and trunnions
- often modular grinding plants lack the capacity to dry raw materials, which is a particular issue when moisture-rich pozzolans must be used
- as the increment in the circulating load considerably decreases the modular grinding plant's capacity, it may be difficult to obtain high degrees of fineness in the final product
- challenges in finding specialised operators and technical staff
- mini plants require heavy equipment
- during installation, a significant amount of transport equipment is required and logistics costs can be high
- civil works can be expensive due to the foundations required for the buildings and equipment of significant height and weight (eg, vertical mills).

Integrated dryer-milling system

To address these issues, IMSACOL developed its Integrated Dryer-Milling System (IDMS), which is a product of the company's simplified strategies, use of state-of-the-art technologies and its drive to minimise transportation and storage issues.

Raw material reception, drying and dosing

Upon arrival at the plant, raw materials such as clinker, gypsum, limestone

Representation of IMSACOL's Integrated Dryer-Milling System



and pozzolan are fed into hoppers with gravimetric dosing systems. Where raw materials have a moisture content higher than two per cent, the dosing systems feed a flash dryer that simultaneously pregrinds the material after all metallic contents have been removed.

Pregrinding

The suitably-dosed and dried materials are then transported to a roller press to be pre-ground to a specified fineness for the ball mill. Vertical shaft crushers can also be used but while they require a lower investment, they have a higher rotation of wear parts.

Grinding

The materials, now with a very low moisture content and of intermediate fineness, are fed into the single-chamber ball mill for grinding. The ball mill includes classifier plates and an adjustable discharge diaphragm. Thanks to the

mill geometry and the high feed and exit diameters, the material is ground efficiently. Due to the distribution of grinding media within the mill and the high ventilation that quickly transports the ground particles, the mill is able to achieve its maximum output with optimal energy consumption. As a result, all materials are swiftly transported by air to a last-generation separator, which works at low circulating loads with high fineness requirements for the final product. As this eliminates the need for an elevator, recirculation fan, separation cyclones and ducts between equipment, valves, filter and transport equipment, the process is simplified and requires lower capital expenditure costs.

Storage and dispatch

Storage facilities allow for the storage of at least to two types of cement. Where fly ash is blended, a further silo with a blending system is installed.

Each IDMS is supplied with sufficient storage to produce at least two types of cement



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System benefits

The IDMS is suitable for small to medium-sized grinding requirements. In this case, its benefits include:

- lower energy consumption when compared with traditional grinding systems: 35-39kWh/t for OPC with a fineness of 4000Blaine (without drying)
- option to process materials with a high moisture content, particularly useful when artificial and natural pozzolans are used. Thermal consumption for drying: 180kcal/kg of dry material through the dryer, with an average 16 per cent moisture
- cost savings of around 30 per cent in terms of the transport of equipment
- simplified plant layouts that result in lower capital expenditure costs due to the equipment used, reduced need for civil works and lower assembly costs
- simple control systems, enabling easy operation by available operators
- cement production that is customised for the regional market is made easier
- the lead time from purchase order to commissioning is 10-12 months.

Projects to date

IMSACOL installed its first IMS system in 2016. The project was awarded by Colombian cement producer Fortecem.

Since the commissioning of this first installation, the supplier has been awarded a contract for another line by a different customer in Colombia. For this project, Gebr Pfeiffer (Germany) will supply the mill and filter while the remaining components are designed and supplied by IMSACOL. ■

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