

FCB Horomill®: reducing power needs, increasing production.

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The cement industry is known to be an energy intensive industry, and the last two decades have seen the emergence of innovative technologies in the field of grinding, aiming at reducing the grinding process's electrical demand. The FCB Horomill® was developed and came to the market in the 90s with this target, which it has fulfilled, in the cement industry as well as for minerals grinding, with figures ranging from 40-50% savings compared to conventional ball mills or 20-25% compared to vertical mills.

However, market trends now focus on reduced CO₂ production, alongside production cost reduction and high flexibility, thus pushing forward blended cements. The latest evolutions of the FCB Horomill® plant exactly fit with this requirement: from coarse to very fine product, from dry to highly moist material, from soft to very abrasive compound, the FCB Horomill® is the only single mill suitable for multiple applications.



Cement grinding plant in Teresa, Philippines.

Cement grinding: moist additives and fine products

In the FCB Horomill® system, drying is achieved in the classifier gas circuit, in the rising duct below the separator with use, or without use, of a flash dryer. When flash dryer is used, the drying is done by direct feeding of the moist material into the riser, so that the mill deals with rather dry material only.

Drying being achieved on a flash mode, the heat requirement is optimised. In addition, water injection in the mill is unnecessary neither for mill stability nor temperature control, allowing for further heat savings.

With such enlarged drying possibilities, the FCB Horomill® enables producing not only pure Portland cement but also highly blended cements using additives such as pozzolana, limestone, fly ash, or slag. The blending achieved in FCB Horomill® plants with pozzolana reached the level of c/k equal to 1.8 in the Philippines.

Moreover the absence of water injection in the mill has another two very sensitive impacts on the cement grinding process. Firstly, by drastically reducing the potential of cement pre-hydration. Known drawbacks of cement pre-hydration are the risk of silo blockage and a decrease of cement performance. Known remedies to this loss of performance are either an increase in the cement fineness and corresponding specific energy consumption, or the addition of costly grinding aids, or

the reduction of the additive's percentage in the recipe. Our 'zero water injection' working principle is achieved by an accurate measurement of the circulating load and a specific control of the material bed, which together ensure the mill stability. Secondly, preventing heavy wear in the mill, thereby reducing maintenance costs.

Cementos Fortaleza Tula in Mexico, perfectly illustrates the high performance of blended cement grinding. For the production of CPC-30-R (a limestone blended cement with 69% clinker only, ground to 4400 Blaine), the energy consumption for the whole workshop is 21,5 kWh/t and 13,9 kWh/t for the mill only, while compressive strength reaches 30 MPa after only 7 days.

Raw meal grinding

The evolution of the FCB Horomill® plant has also seen increased capabilities within the raw meal grinding application through the incorporation of a flash dryer in the gas circuit, thanks to the unique system concept with the grinding and classifying functions being dissociated. The recent commissioning of different raw grinding plants has provided a representative picture of its ability in raw meal grinding applications: lowest energy consumption, high drying capacity, zero water injection, and high resistance to wear.

An interesting example is the Tula, Mexico plant. The raw grinding plant is fitted with the FCB Aerodecanter - Flash dryer within the FCB TSV™ classifier gas circuit, as the total feed moisture can reach up to 6%. Performances of the grinding plant were successfully met, with a production in excess of 300t/h of raw meal at R90µm=11,8%, and an electric power consumption of 6,9 kWh/t for the mill only, and 11,2 kWh/t for the whole workshop, inclusive of weigh feeders, belt conveyors, bucket elevator, and transport to homo-silo.

The Tula plant mills are wholly representative of the unique opportunity offered by the FCB Horomill® having identical mills for raw and cement grinding plant, hence allowing one single set of spare parts for these two distinct sections.

Conclusion

Whether considering cement, raw meal or slag grinding, the FCB Horomill® plant demonstrates outstanding ability to operate at the lowest operating costs and to maximise production. Indeed, while it is already providing with the lowest energy consumption as detailed above, it provides additionally significant process advantages, engendering new opportunities for plant operators to optimise production. Moreover, it offers the possibility of installing one single type of mill in a complete plant with raw meal and cement being ground in identical mills, leading to minimised capital expenditure for spares, common training requirements and simplified maintenance organisation. ■

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