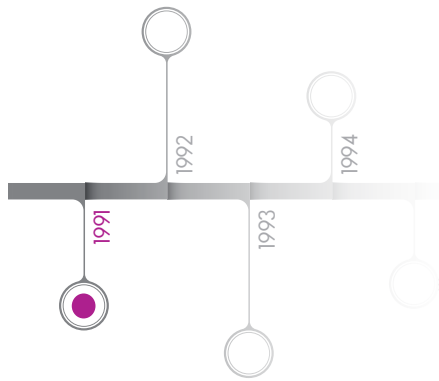


“I came to Fives fresh out of engineering school in the 1980s, when Fives was hiring a lot of young engineers of which I was one. In 1991, we were challenged by our bosses—and one determined client—to create a new cement grinding process. Knowing we had the backing of the Fives Group and the trust of Fratelli Buzzi CEO Sandro Buzzi and then-Technical Director Giovanni Brunelli, we began to develop a bed compression grinding process that relied on centrifugation. We knew that centrifugation would help us overcome the limitations of a roller press, so we started making a pilot device. This was the beginning of the FCB Horomill®.

“Those early days were certainly exciting, but challenging, too. Not everything worked as first expected: even though we had great grinding process results right from the start, we had a lot of work ahead of us to perfect the mechanical design. For me, it meant going back to my schoolbooks and reviewing fundamentals like dynamic mechanics to fix difficulties we were facing. We persevered through a lot to get the technology to the point where we could broadly commercialize it.

“But it was worth it.”

Alain Cordonnier
CEO, Fives FCB



1991-1994: A REVOLUTION IN GRINDING TECHNOLOGY

Responding to Fratelli Buzzi SpA's challenge to develop a new grinding process, Fives first examined the limitations of the technology of the time. Traditional ball mills had limited drying capacity and required (and still do require) a high amount of energy for the grinding process. Meanwhile, the newer technology on the market—vertical roller mills—needed to add significant amounts of water to the grinding process to compensate for unstable bed material behavior and thus ensure continuous mill operation.

FIRST STEPS

Fives' engineers set out to disrupt the industry with a breakthrough solution that would at once reduce energy use, eliminate water need, and globally exceed performance of traditional mills.

The first step involved the development of a new classifier, which would become known as the FCB TSV™ Classifier. This new device improved separation efficiency for the future new mill to work in the best conditions.

Next, the team designed an industrial process based on the idea of a horizontal roller press, which had seen some success in Germany. The roller press reduced energy requirements for the grinding process, and a prototype was built for pre-grinding. While the prototype had limitations that impeded its marketability, the Fives team knew it was on to something with this nascent compression grinding process. Fratelli Buzzi—already growing into eventual cement industry powerhouse Buzzi Unicem—knew the engineers at Fives were working on grinding innovations. It saw opportunities in the designs Fives had already come up with, and it partnered with them to make a breakthrough.

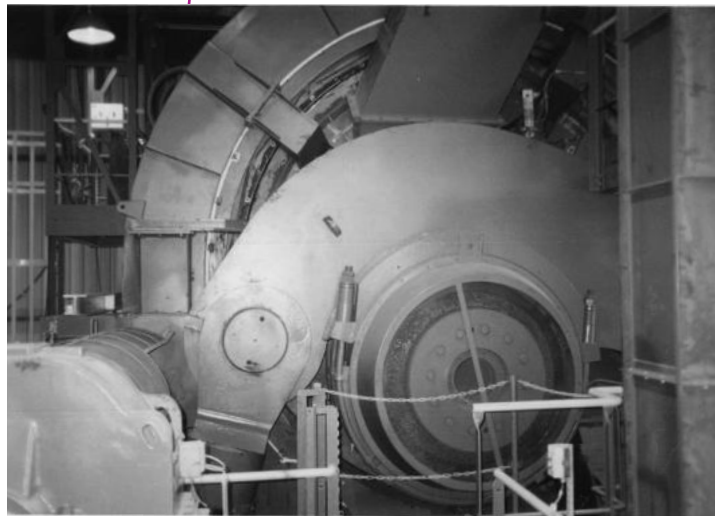
CENTRIFUGATION IS THE KEY

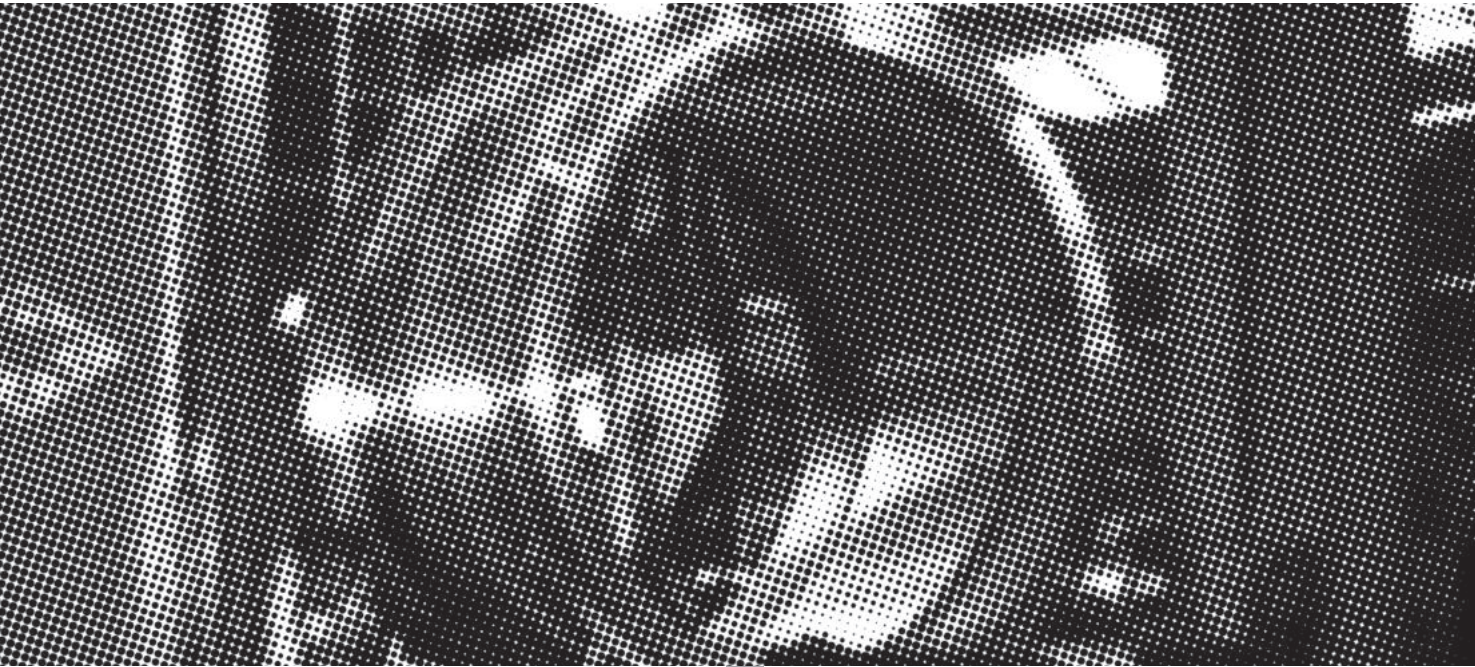
The key moment was when the team designed a process using one roller inside a rotating shell, using centrifugal force for material bed control. (Other technologies, such as roller presses and vertical mills, were limited by gravity.) Connecting the new system to an FCB TSV™ Classifier, Fives had its first small-sized mill pilot, with an 800 mm shell and 300 mm roller diameters. It started up for the first time in July 1991. Taking its name from the horizontal roller of its bed compression process, it became known as the FCB Horomill®.

Having proven that the design process worked, the team spent the next two years working to improve its mechanical design and build the first FCB Horomill® industrial prototype with a 2200 mm shell diameter—for Fratelli Buzzi, at its facility in Trino, North Italy (see Success Story: Fratelli Buzzi, p. 12).

SELLING THE CONCEPT

Though there was early resistance to the new technology, Fives believed in the FCB Horomill®'s capabilities and presented it for the first time, in 1993 at the VDZ conference in Germany. Turkish cement producer Çimentoş then placed an order for what was the largest FCB Horomill® at that time—a 3400 mm shell diameter, for its Izmir plant (see Success Story: Çimentoş, p. 13). Fratelli Buzzi further showed its belief in the solution by ordering FCB Horomill®s—for cement and raw mill grinding—for its Mexican affiliate Cementos Moctezuma's new plant in Tepetzingo, with many more orders in the years to come.





1991

Fives tests the pilot version of the *broyeur horizontal à galet (BHG)*, which would soon become known to the global cement industry as the FCB Horomill®



1994

Turkish producer Çimentoş orders an FCB Horomill® 3400 for its cement grinding plant in Izmir, Turkey (see [Success Story: Çimentoş](#), p. 13)

Cementos Moctezuma orders two FCB Horomill®s for cement and raw meal grinding, for its new plant in Tepetzingo, Mexico, the first ones on the American continent (see [Success Story: Cementos Moctezuma](#), p. 19)

1993

Fratelli Buzzi (now Buzzi Unicem) starts up production with the first FCB Horomill® prototype, beginning an enduring partnership that continues to present day (see [Success Story: Fratelli Buzzi](#), p. 12)

FCB Horomill® technology is presented to the cement industry for the first time at the International VDZ Congress in Germany



“I consider the Trino Horomill prototype to be an adopted brother. I remember well in September 1993, at the VDZ International Congress in Düsseldorf, my father Sandro proudly presented the mill’s first results by saying, ‘A new baby is born!’ That machine was truly a technological breakthrough and immediately attracted great interest.

“That baby has come a long way. It has been used to test the grinding of all possible materials in our sector and has enabled the development of its numerous older siblings that we have in operation in many of our factories.”

Luigi Buzzi
Executive Director,
Chief Technology Officer Buzzi S.p.A.



SUCCESS STORY

FRATELLI BUZZI

Trino plant • Trino, Italy



Challenge: Fratelli Buzzi (now Buzzi Unicem) was convinced there was a better way to grind cement than the traditional ball mill or other initial-stage roller mill methods. They believed it was possible to create an innovative grinding process using centrifugation, which could be installed at its cement-producing facilities.

Response: Fives designed and tested a pilot mill before jumping to an industrial prototype by partnering with Fratelli Buzzi to design and build a 2200 mm prototype at the Trino plant.

Result: Thanks to the close collaboration of the two teams, the FCB Horomill® was born. The cement quality matched Fratelli Buzzi’s needs, and energy savings were high. With this first success, Fives would launch into a long-term relationship with Fratelli Buzzi, which has continued to order FCB Horomill® grinding mills over the 30 years since the first order.

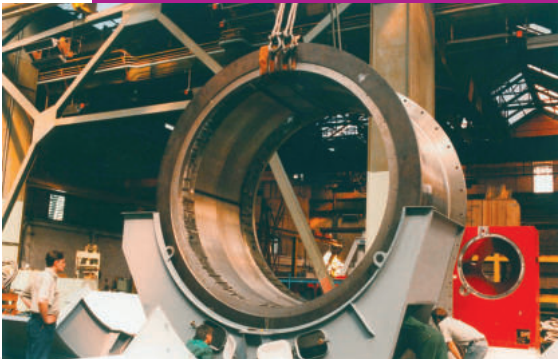
Added value: Decades of collaboration between Fives and Fratelli Buzzi have led to countless operational successes to the mutual benefit of both groups.



SUCCESS STORY

ÇİMENTAŞ

Izmir plant • Izmir, Turkey



Challenge: Turkey experienced a booming construction environment in the 1990s, but electricity prices were high. Çimentoaş thus needed to increase cement production at its Izmir grinding plant in an energy-friendly way in comparison to its existing plants.

Response: Fives installed and started up its largest grinding plant to date, the FCB Horomill® 3400, with a 3.4 m shell diameter.

Result: The FCB Horomill® handled grinding for both Ordinary Portland Cement (OPC) and Pozzolan cement, the latter of which was composed of 30% trass. Compared with a traditional ball mill, the cement production saw 35-50% energy savings.

Added value: Thanks to its stable automated operation capabilities and short residence time, the plant could switch from one product to the other within 10 minutes without requiring plant stoppage.