

# Record-breaking 12,000 tonnes per day production line



**One Source**

**CASE: Holcim's US cement plant in Ste. Genevieve**

The world's largest single-kiln clinker production line has the world's most advanced technology and among the lowest emission limits. All from FLSmidth.

# New technology and innovative solutions

**Holcim's state-of-the-art Ste. Genevieve plant features a vast array of FLSmidth's core processing equipment, including a range of new technology.**



FLSmidth was able to act as a complete one-source supplier.





Holcim's US cement plant in Ste. Genevieve, Missouri, is a record breaker. With four million metric tonnes annual capacity, it has the world's largest single-kiln clinker production line. Its equipment and technology are the world's most advanced. Its emission limits are among the world's lowest. And it was entirely designed and supplied by FLSmidth.

Holcim's first approach for the new Ste. Genevieve plant was to build two 6000 MTPD lines, as it would give them commonality in plant operations as well as spare parts. However, closer analysis of the construction costs - one line vs. two - indicated that one line would be the more cost-effective approach for the following reasons:

- Slightly lower cost of fuel and power
- Lower cost of equipment
- Less manpower to operate and maintain
- Less area (land) required to install, which requires less site preparation, etc.

### Latest equipment

This state-of-the-art plant features a vast array of FLSmidth's core processing equipment. The focal point of the plant is the pyroprocessing system with a Multi-Movable Cross-Bar™ cooler that is 23 grates wide by 123 grates long and has a seven-row CIS-MFR fixed inlet and a six-roll Heavy Duty Roll Breaker at the cooler discharge. Additionally, there is a dual-string, "hybrid" Low-NOx In-Line Calciner (ILC) preheater; a DUOFLEX™ burner designed for firing coal, petcoke, waste oil and solid AFR; and a three-support rotary kiln that is 6.6 meters diameter by 93 meters long. There are four Atox mills, two for raw grinding and two for coal grinding. The clinker is processed in four OK Vertical Roller Mills, reinforcing this solution as the market standard for finish cement grinding. This plant is capable of loading cement by truck, rail or barge.

Completion of the line included a range of new technology and innovative solutions by FLSmidth, beginning with the preheater hybrid design and the tangentially supported three-pier kiln. Other new designs and technology include:

- Tertiary air dampers and supporting system for the tertiary air duct
- Multi-Movable Cross-Bar™ cooler
- Burner trolley for the main kiln burner
- Six three-stage bevel gear reducers designed for the raw and finish mills
- Two MVT-KOCH conveyors (a tube conveyor to transport cement from the silos to the harbour loadout silos and a U-shaped conveyor for raw material transport from the harbour to the coal and additive stockpiles)
- OK mills

### One-source supplier

The overall success of the project was due to FLSmidth's ability to act as a complete one-source supplier of engineering services, project management and commissioning as well as all major machines and auxiliary equipment. Some highlights of the scope include:

- Gyratory crusher and apron feeder
- Process and nuisance dust collection equipment
- Vertical mill gear reducers
- Stackers and reclaimers and tube belt conveyors for raw material and cement transport
- Kiln feed and fly ash transport systems
- CF-Silo withdrawal equipment
- Plant-wide pneumatic transport equipment and a ship unloader
- Control system including a RoboLab

The resources of over 600 engineering and business professionals at our US headquarters, located in Bethlehem, Pennsylvania, were supplemented by project centres located in both Denmark and India in the worldwide execution of this contract. To improve and expedite document transfer, FLSmidth's exclusive collaborative web portal, MyFLS, was utilized to distribute engineering and installation documentation to many recipients including Holcim, its main contractor and the various engineering design firms engaged by FLSmidth in performing the overall design of this plant.



## Full production

Work on a plant of this unprecedented size posed a number of challenges to achieve full production on schedule:

- An aggressive delivery schedule
- An expanded use of global vendors, some of them new to FLSmidth
- A huge backlog in the global vendor base
- The novelty, size and complexity of the preheater tower and major equipment and systems
- Incorporating Holcim's drawing numbering system and equipment numbering system (HAC system)
- An electrical database developed but not implemented by Holcim on a project of this size and complexity

Due to extensive dry commissioning planning, essentially all plant equipment reached full production within the first month after start-up. The sequence of operation started with two cement mills in May 2009, followed by the raw mill departments in June 2009 and the pyroprocessing system in July. The sequence culminated in first fire on July 3 and first clinker production on July 5, 2009.

The plant achieved 12,000 tpd of clinker production by its second month of accumulated run time. In September 2009, the plant's first full month of operation, it had a 94% availability rating, excluding scheduled stops. The month of October 2009 was even more impressive, yielding an availability of 99.6%. Successive starts thereafter all performed with equally impressive reliability.

The plant reached its world record status on November 21, 2009 when production resulted in an equivalent clinker feed rate of 13,160 tpd. During this period, kiln operation was very stable and the quality of the clinker produced met or exceeded Holcim's requirements.



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