

*Wear resistant linings a benefit for
Florida Crushed Stone's Brookville cement plant.*

Basaltic linings extend life of separator and cyclones

Edited by Mark S. Kuhar

Florida Crushed Stone's Brookville, Fla., cement plant was established in 1985 as a way of profiting from waste limestone tailings produced by a nearby mining operation also owned by the company.

The dry process cement plant now produces 600,000 st/y, selling the product to ready mix operators, contractors, the state of Florida and the state of Georgia.

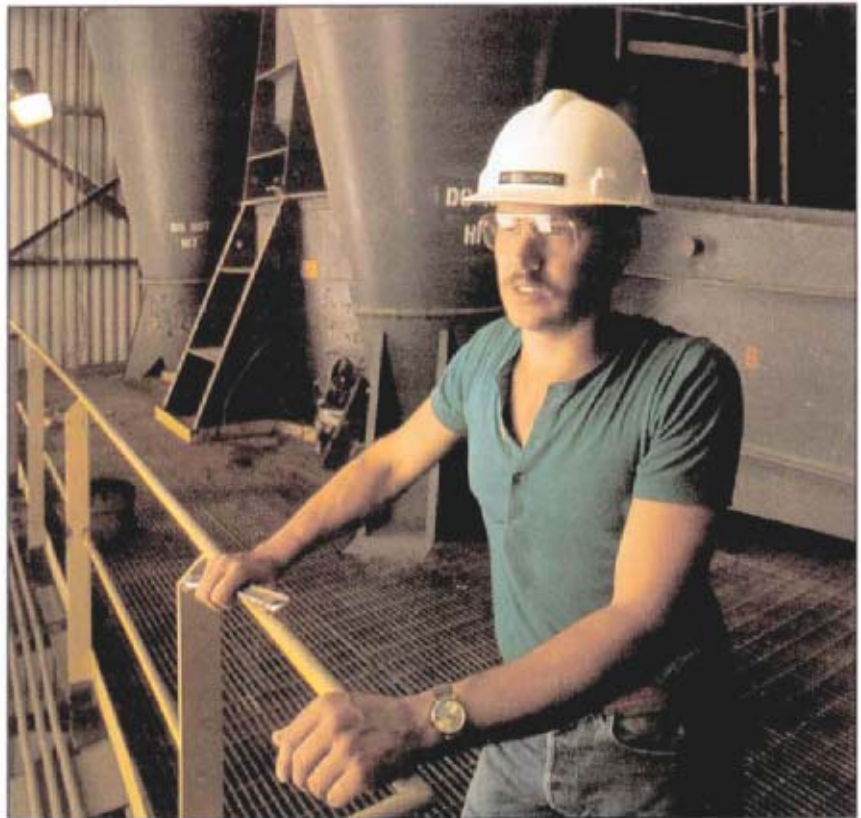
The plant was built by Polysius, a West German firm. The Cyclopol cement separator plus its four surrounding cyclones were installed with an added feature recommended by Polysius to extend working life—basaltic ceramic tile, annealed to withstand the abrasion produced by cement clinker and cement dust.

Florida Crushed Stone produces approximately 145 st/h of Type I and Type II portland cement through the Polysius separator, more than its rated capacity of 120 st/h, to take advantage of the lower electricity costs that prevail during off-peak hours.

This allows the separator to be shut down during high electricity demand periods and still handle the total plant requirement.

According to Florida Crushed Stone process engineer Andy Hollingshead, the separator generally runs from late morning to early evening, and again from late night until dawn. The need to run during these hours was reduced somewhat in May 1988, when a 125-megawatt power plant came on line.

The Cyclopol separator is part of a closed circuit process, and actually handles 390 st/h. Because not all of



Florida Crushed Stone process engineer Andy Hollingshead in front of two of the four Polysius cyclones surrounding the air separator at the cement plant. The equipment, located in the finish mill, has operated for three years without downtime because it is lined with a protective basaltic ceramic material.

the ground clinker is fine enough to be separated off as product to the four surrounding cyclones, the oversized material is recirculated through the grinding system.

When the system has achieved a "steady state", usually about 1 ½ hours after start up, 250 st/h are recycling from the separator back to the grinding process.

So during "steady state" operations,

the separator receives 390 st/h from the feed mill, 140-145 st ending as a finished product, plus the 250 st/h that are recycled to be fed through again.

Clinker for the grinding mills is produced in a 14-ft, 5-in. diameter Polysius Gepol-type kiln, 229 ft, 8 in. in length.

Abrasion potential

Abrasion could clearly be a problem

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Basaltic lining

Expected lifetime of lining material is 20 years, based on field experience

in this type of separator. The ground clinker to be separated enters the air separator via an air slide and is distributed evenly throughout the separator by a rotating disk.

Abrasion occurs from the impact of the ground clinker being tossed against the sides of the separator by the centrifugal action of the rotary disk distributor. Abrasion also occurs as the hard clinker slides against the sides of the separator.

Separation is also achieved with a regulated air stream which enters the separator from below at 4,000-8,000 cu ft/min, depending on the capacity required. The air stream is further con-

trolled by guide vanes, which act on the air flow to separate the fines from the coarser materials to be recycled.

The four cyclones which receive the finished product are subject to abrasion as the finer particles are removed from the airstream by centrifugal forces which cause the abrasive cement to stay against the sides as it spirals down to the outlet.

Because the separator and cyclones are handling abrasive materials, protection against abrasion is vital.

Separator/cyclone linings

The company which supplied the linings, Abresist Corp., lined the separa-

tor and cyclones at its Urbana, Ind., facility before Polysius installed them at Florida Crushed Stone. At the Abresist Corp., 2,300 sq ft of custom-designed hexagonal tile were installed using cement mortar.

The lining material installed, called Abresist, is an annealed basaltic ceramic which becomes smoother and more polished with use. The tiles are 1 ¼ in. thick, and periodic inspection of the cyclones and separator have shown no appreciable wear. Expected lifetime of the lining material is 20 years, based on field experience in other cement plants.



Florida Crushed Stone's Brooksville cement plant processes 600,000 st/y of Type I and Type II portland cement.



A close-up of the basaltic lining inside the air separator shows very little wear after three years, as evidenced by the fact that the honeycomb pattern is still quite visible. Each tile is 1 ¼ in. thick.



A portion of the air separator, flanked by two of its four cyclones. The system handles 390 st/h during "steady state" operations, achieved 1½ hours into an operating cycle—140-145 st end as finished product, while 250 st/h are recycled to be fed through again.