ELIMINATING PNEUMATIC WEAR

FLORIDA ROCK'S NEWBERRY PLANT TACKLES

high wear problems

In operation since December 1999, Jacksonville, Fla.-based Florida Rock Industries, Inc.'s Thompson S. Baker Plant in Newberry, Fla. , encountered start-up challenges that surfaced as production proceeded. The permitted operating capacity of the plant is 800,000 tons of clinker per year.

Following commissioning of the plant, tackling high wear problems became a priority for the maintenance management team at Florida Rock. Wear in the clinker de-dusting system led to the expenditure of many hours of maintenance manpower, loss of efficiency, and safety concerns.

Central to the system is a "Grasshopper" elbow that controls the speed and flow of clinker dust to the electrostatic precipitator. The tremendous velocity of the particle-laden dust stream coupled with high temperatures coming off the clinker cooler rapidly eroded the elbow and standard-issue duct system. As the highly abrasive clinker dust continually attacked the elbow, frequent repairs became necessary. Pushing full capacities exacerbated the wear rate, thus increasing maintenance requirements and patching. When the need to eliminate or drastically reduce system wear was evident, Florida Rock turned to the A.J. Weller Corp. for a solution.

Solving wear problems

In the business of solving complicated wear problems for more than 20 years, the A.J. Weller Corp. of Shreveport, La., offers a complete line of wear-resistant materials incorporating the latest advances in composite technology. When the Newberry plant's original duct wore out after three years of production, the company was asked to provide a turnkey solution that would eliminate the wear problem while operating within the system's requirements. In a collaborative effort with the Florida Rock team, A.J. Weller designed, fabricated, and delivered a new elbow lined with WellerDensit.

WellerDensit is a chemically bonded ceramic liner specifically designed to prevent severe pneumatic wear and fine-particle abrasion. It comprises a mixture of ceramic materials and premium wear-resistant aggregates, forming a trowelable, castable, or sprayable liner for wear protection. Preparation involves mixing the compound with a small amount of water in a specially designed paddle pan mixer to start a chemical reaction that hardens the product to a solid, ultra-dense state. Typically, the mixture sets in 45 minutes and reaches working hardness in one to two days, depending on the temperature when applied. A.J. Weller utilized this product on the grasshopper elbow to eliminate continuous wear.

Repair dynamics

WellerDensit technology is effective because the wear liner employs a mechanical bond in the form of an expanded metal mesh that is welded onto the inner steel surface to be protected. The difference in thermal expansion between steel and the ceramic composite material is thus absorbed, so broad cracks and spalling are avoided. In addition, the mechanical bond allows the structure to become self-supporting. Seamless in design, the product conforms to complex geometric shapes.

Installation

Florida Rock's previous experience with WellerDensit provided the basis for an informed decision in selecting the same treatment for the situation at hand. A.J. Weller supplied the elbow in two pieces for easy field installation. According to the Florida Rock management team, high-level workmanship in the fabrication provided a superior fit to the existing system—no installation modifications were necessary. To date, Florida Rock's expectations have been fulfilled as the elbow performs correctly during production.

Pneumatic wear processing problems require solutions that meet the demands of all facets of an application. The ability to form a monolithic, chemically bonded ceramic liner without seams or exposed fasteners reduces wear and enhances air flow. WellerDensit solutions provide a proven alternative for heavy industrial processing plants with extreme fine-particle, high-velocity abrasion. CA

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