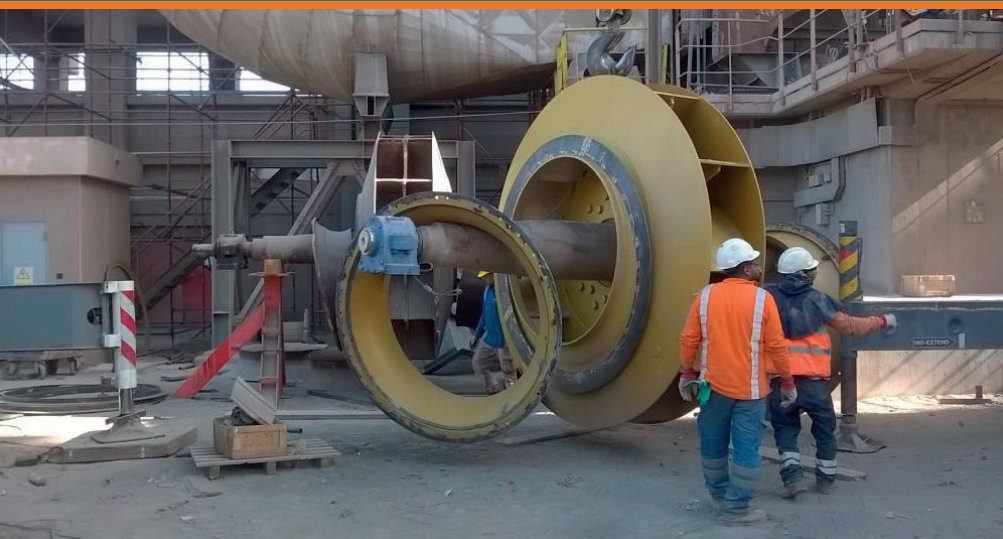


Successfully addressing kiln ID fan erosion issues at Lafarge Cement, Egypt



Dust laden is highly present in air and gases that are moved at the cement plant. This dust can have a high concentration in the media that are flowed by cement process fans.

As a consequence, depending on the volume and type of dust, fans are subject to increased wear.

Introduction

The various fan components which are exposed to this abrasive dust are facing material removal by the particulates that cause plate thickness reduction. This can lead to a significant reduction in the lifetime of the equipment, vibrations and plant shut downs.

High dust concentration and/or highly abrasive particulates can lead to a very fast reduction of the fan components thicknesses. Usually this erosion is not ax symmetric which causes rotor imbalance and increased load on the bearings and vibrations.

Challenge

Several years ago, erosion appeared on the kiln ID fan of line 5 at Lafarge Cement, Egypt El Sokhna plant. This facility operates 5 integrated cement production lines at El Kattamia, Suez, Egypt which has a total cement production capacity of 10,6 mtpy.

Line 5 kiln ID fan has been operating since 1996 without any problem of erosion. However, the dust laden that was flowing through this fan had increased due to various parameters. In these new operating conditions, the existing kiln ID fan could not run without troubles. As Lafarge Cement was holding several spare rotors, the plant maintenance team carried-out repairs of these rotors by adding new wear plates on the airfoil design blades.

The repairs were carried out by local companies. After they were repaired, the rotors could withstand the erosion but still required repairing on a regular basis.

After some time, all the rotors were severely damaged and Lafarge Cement considered retrofitting this fan. The team's objective was to get a new rotor that would use a more adapted design to the current dust laden without compromising on the fan performance.

Lafarge Cement asked Howden to conduct this line 5 kiln ID fan retrofit job at El Soukhna plant. With its numerous brands and over 5000 cement process fans operating around the world, Howden has unrivalled experience in retrofitting cement fans throughout the world.



All Howden solutions are tailor designed to perfectly fit each application with the aim to achieve the best performances at the lowest cost.



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Solution

The Howden and Lafarge Cement teams collaborated for the full analysis of the situation. Howden retrofit experts carefully studied the kiln ID fan’s operating conditions and its design.

The result of this study coupled with a dust chemical analysis were used for the selection of a new fan design and hard-facing material to improve the lifetime of the rotor.

Howden experts selected a fan design which provides high efficiencies and exhibits low erosion levels.

This particular proven design is very widely used in cement plants all around the world. It can achieve almost the same shaft absorbed power than the previous design. The new Howden fan is using backward curved blades as apposed to the airfoil design that was on the previous fan. See **table 1** for details.

This has allowed Lafarge Cement to keep some of the existing equipment such as fan casing and motor which has minimised Lafarge Cement’s investment and the time necessary for the installation of the new solution.

Table 1: Results of the main filter fan on-site test before retrofit

	Previous fan	New Howden fan	Units
Flow	212	212	m ³ /s
Inlet static pressure	7.400	7.400	Pa
Absorbed power	1.949	2.031	kW

Outcome

The new fan was installed and commissioned at the end of December 2017. The start-up was completed without any problems and today the new rotor’s performance is excellent as it has not been eroded by the abrasive dust and is achieving very smooth performances. This new solution has also generated spares inventory reduction.

Lafarge Cement is extremely satisfied with the performance of the new Howden fan as it has met with their expectations in terms of erosion resistance and fan performance without replacing the existing casing and motor.