ProcessBarron
SouthernField & EnvironmentalElements

OPTIMIZING A SOUTHEASTERN PAPER MILL

Updating a Historic Dust Collector and Fan System for Savings

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SYNOPSIS

The paper mill's ID fan and dust collection system had a long-standing problem with inefficient dust particle capture, excessive pollution levels, and high energy costs. ProcessBarron modified the system to reduce system pressure drop and increase fan efficiency by taking a comprehensive total-system approach: analyzing the interactions of each component, isolating the trouble spots, and providing a complete engineering, testing, design, fabrication, and installation solution that provided a rapid ROI.

IN SEARCH OF A HOLISTIC APPROACH

Located in the south, the paper mill was founded in 1947. It produces over 500,000 tons of paper products a year, including kraft paper, paper towels, napkins, and bathroom tissue. The mill is largely self-sufficient, generating about 75 percent of its own power.

Despite this near self-sufficiency, the mill had excessive system resistance and poor particle handling in its No. 4 combination boiler's ID fan system. These systemic problems resulted in high fan BHP and high pollution levels. These known problems had been allowed to persist because the legacy system had primary, secondary, and tertiary mechanical dust collectors in it, making any attempts to find a workable and affordable solution complicated.

The customer needed a holistic approach to the problem that would assess what could be kept, what had to be replaced, and what could be retrofitted to achieve the greatest increase in productivity and efficiency with the least intrusion and interruption.

Finding a service provider to meet all these needs and operate within the required parameters was challenging. Many companies in the industry prefer to avoid the risks associated with significant retrofits and the re-use of existing system components.

They will often simply recommend replacement, without even inspecting the system. However, ProcessBarron, drawing on its extensive experience with similar systems, recognized the importance of inspecting every piece of equipment to identify the true causes of the plant's air handling problems, rather than just devising a superfi cial approach.

THE ISSUES WERE MANIFOLD

Working from first-hand, on-site inspection and analysis of the system, ProcessBarron engineers determined that it was not only the fan or draft system, but also the three mechanical dust collectors that were causing excessive pressure drop. The collectors were doing a notably sub-par job of particle collection. This inefficient dust particle capture was contributing to the plant's excessive pollution levels and high energy costs.

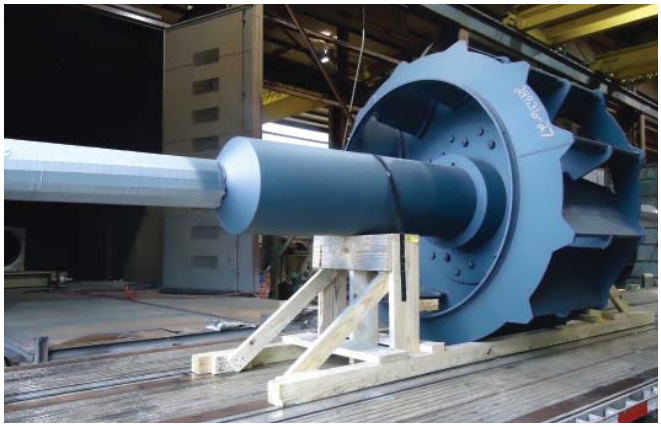
The key to solving the problems lay in finding a way to improve the dust collectors, which in turn depended on modifying the fan so that it would efficiently produce the required system flow and pressure. ProcessBarron had determined the problem and outlined a solution, but tearing out the three dust collectors and replacing them turned out to be financially and logistically unworkable for the customer.

I.D. FAN TECHNICAL DATA

FAN DESCRIPTION		TECHNICAL DATA	
FAN SIZE	744/744	VOLUME (ACFM)	290,000
FAN STYLE	Radial Tip	STATIC PRESSURE	17.09
FAN SERIES	T52E	TEMPERATURE (ºF)	450
ARRANGEMENT	3D2	SPEED (RPM)	1185
% WIDTH	105	POWER (BHP)	1056

WORKING WITH EXISTING EQUIPMENT

The ultimate solution was a daring stroke of engineering ingenuity: ProcessBarron would work with all existing casings, all existing geometry, and all existing footprints in the system but gut the internals of the three dust collectors. Essentially, the dust collectors were reduced to empty boxes — each just another piece of the ductwork. The casing of one of the original collectors was then used to create a single, efficient dust collector. Twenty-four-inch collection tubes were installed to cope with the large air volume required by the system. The ID fan was then retrofitted with a 74.5-inch optimized heavy-duty radial-tip rotor, customized to fit the existing fan housing.

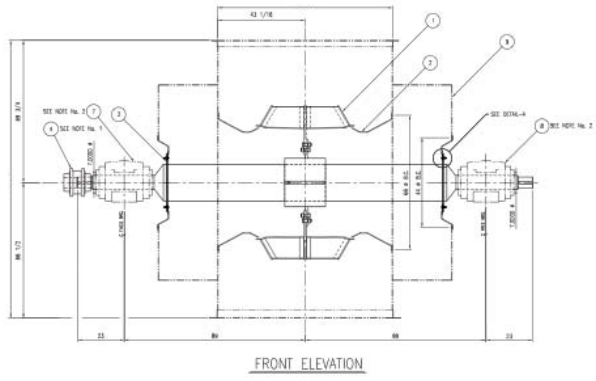


The paper mill ID fan was retrofitted with a radial-tip rotor at ProcessBarron headquarters in Pelham, Ala., and then installed in the existing fan casings at the mill.

MONEY SAVED, EMISSIONS REDUCED

When ProcessBarron submitted their final drawings and plan to the customer, they also included a guarantee to meet specific collection efficiency for the dust collector and maximum energy consumption for the ID fan. ProcessBarron was so confident with their solution — based on their expertise, experience, and testing — they knew it wouldn't fail.

The project went forward without incident, when it was completed, the result exceeded even the highest expectations. Calculations showed that the plant now saves about 1,000 horsepower per year, equating to a savings of close to $500,000 annually, producing an ROI in about two years.



Front elevation of the final mechanical draft fan design.

This figure doesn't include ancillary savings, such as reduced maintenance costs now that the plant only has one dust collector to maintain instead of three, and reduced expenditure due to higher efficiency in particle control. These improvements also reduce emissions and increase productivity, further correcting some of the legacy issues of the historic plant.

For more information, or if you have a question about a similar project, please contact:

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