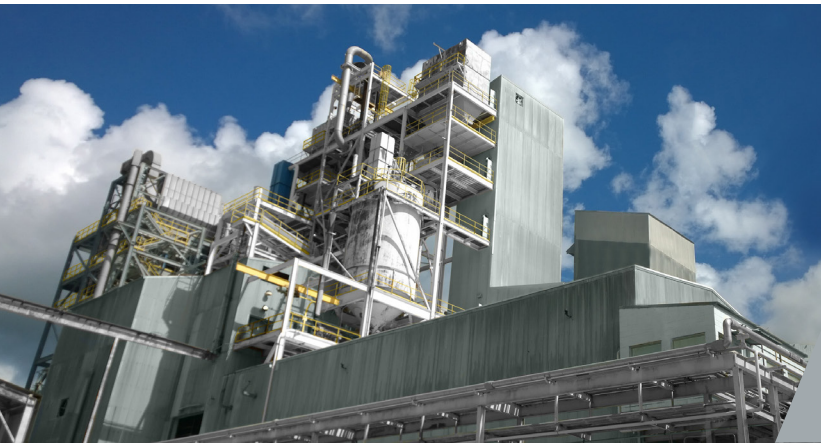
Application Note

Chemical



Reliability Engineers Specify B-PAC™ Controls for Baghouses

Challenge

"Process upsets caused visual emissions, resulting in 9 emergency outages."

The field of Reliability Engineering focuses on the prevention and management of uncertainty and risks of failure with a focus on downtime costs, repairs, and the safety of personnel. These functions are crucial in today's competitive industrial marketplace, where emergency maintenance costs 3 to 4 times more than the same preventive maintenance task.

The Reliability Engineering Department at one of the world's largest chemical companies was tasked to analyze rising costs and downtime associated with powder processing baghouses at their catalyst facilities. This initiative began after several plants reported a significant increase in emergency outage hours and rising operational costs due to baghouse problems. One plant incurred $85,000 in maintenance costs and 216 hours of emergency downtime for one baghouse; another location reported corrosive discharge, damaging nearby structural supports and plant equipment.

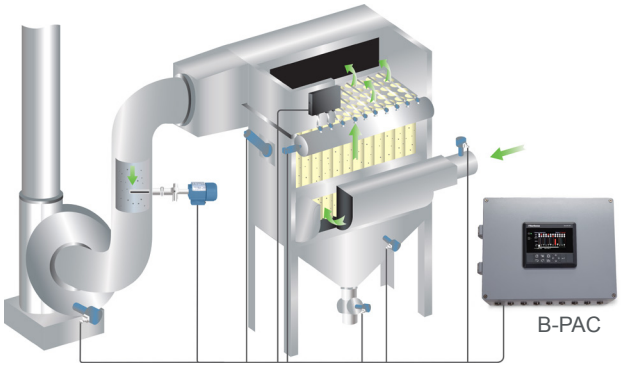
Acid discharge caused by baghouse upset conditions resulted in damage to process equipment structure.

Solution

"After installing B-PACs, we have experienced no visible emissions."

The objective of the Reliability Engineers was to evaluate baghouse operations and make corporate-wide recommendations to improve operations and cut costs. They chose to work with Auburn FilterSense, the technology leader in automated baghouse diagnostics and charge-induction particulate monitoring, calling on their experience and capability to support multiple plants. After identifying what the process engineer described as *"the most troublesome dust collector on-site,"* the plant installed a Auburn FilterSense B-PAC™ (Baghouse Performance Analyzer & Controller) to evaluate its performance and capability.

The B-PAC tightly integrates control of the cleaning system (solenoids and diaphragms) with measurement and analysis of differential pressure, header pressure, and particulate, to optimize filtration and provide preventive diagnostics. Air flow, temperature, fan amps, hopper level, motor controls, damper controls, and other inputs are added for further control and actionable diagnostics.



Application Note

"We've reduced pulse rates from 1,200/hour to 120/hour — saving $12,500 in compressed air."

"Emergency maintenance tasks are responsible for 60% of workplace injuries."

Benefits

Actionable Diagnostics
During commissioning by Auburn FilterSense, one of the B-PACs detected and located a failed solenoid, which quickly demonstrated the value of the system. Later alarms from the same B-PAC indicated high particulate from filter row 20, and a failed diaphragm in row 11. At the request of plant personnel, Auburn FilterSense reviewed the B-PAC's internal SD card log files and confirmed the alarms (see Figure 1). Maintenance quickly replaced the filter and valve. Early detection and repair of the pre-visible leak allowed this site to avoid visible emissions, reduce downtime by eliminating manual leak inspections, and reduce employee exposure to hazardous particulate and confined spaces.

Reliable Low Level Particulate Monitoring
Reliable pre-visible leak detection is made possible by Auburn FilterSense's DynaCHARGE™ particulate monitoring technology. The particle charge-induction sensing technology is fast responding (a necessity for locating leaks) and can monitor well below 1 mg/m^3, enabling plants to prevent excess emissions and product loss, and to protect downstream equipment.

IntelliPULSE Intelligent DP Control
Another B-PAC installation demonstrated the added benefit of IntelliPULSE™ control, which maintains baghouse DP within ±0.1 InWC by automatically adjusting and minimizing pulse cleaning. This maintains ideal air flow through the upstream spray dryer, increasing its performance. Intelligent pulsing significantly reduces compressed air consumption and stress on the filter media, extending filter life and reducing replacement costs. This baghouse's pulse rate was reduced 90% and yielded an annual compressed air savings over $12,000 (see Table 1).

	Before B-PAC	With B-PAC
Annual Maintenance Cost	$46,000	$2,000
Visual Emissions	9	0
Compressed Air Cost	$12,656	$316
Pulse Rate	1,200/Hour	120/Hour
Pulse Frequency	5 Seconds	50 Seconds
Pulse Pressure	100 PSI	75 PSI

Table 1: Return on investment data showing improved process efficiency and plant cost savings.

B-PAC ultra-rugged (field-mountable) user interface displays diagnostics (data also available over Fieldbus).

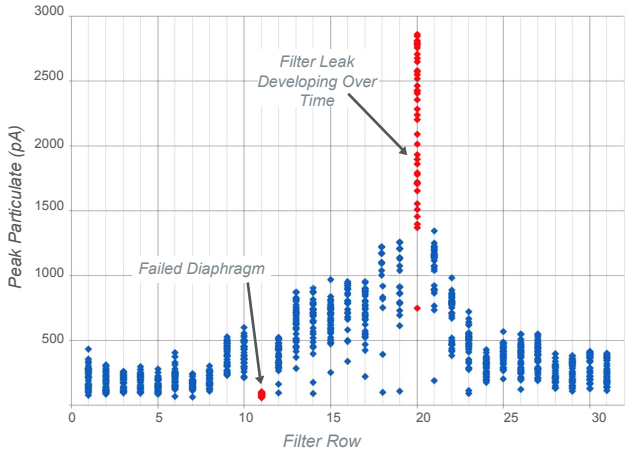


Figure 1: Particulate values over 39 pulse cycles confirm developing leak (row 20). While diaphragm failure is principally detected by pressure signal analysis, it is also detectable here (row 11).

Process

These chemical plants produce catalyst, which is used at refineries in the manufacture of diesel and gas petroleum. The catalyst is processed in a calciner and spray dryer upstream of the baghouse. The baghouse pulls fine particulate from the spray dryer and feeds it into a wet scrubber before venting to atmosphere.

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