

RETROFIT-READY SOLUTIONS TARGET PRIMARY NEEDS

With a market increasingly in search of options, suppliers promote solutions that speak to efficiency and safety concerns for brownfield projects

BY JESSE MORTON, TECHNICAL WRITER

Right now, in the big fan space stateside, there are distinct opportunities for those with the right offerings, connections and timing, according to longtime expert, Bryon Cerklefskie. “When you look at the tax incentives now for capex projects, people are ready to move,” he said. “And you have all this antiquated equipment that sat around for much of the last

half-decade that needs to be either upgraded or replaced.”

Aware of this, players in the sector are releasing and promoting solutions that speak to the loudest needs of the head office, solutions that offer increased efficiency and safety, and that require minimal adjustments downstream. Here is a review of some recent developments.

Reduced Costs and Cleaner Air

SMJ Fans reported that the Shotgun Scrubber, a dual-independent leg wet-scrubbing system, is field-proven after four years of operation at a mine that produces roughly 5 million tons of low-vol met coal per year.

The feedback from the miner, Virginia’s Buchanan Minerals, subsidiary



The Shotgun Scrubber can be custom-designed for specific needs. (Photo: SMJ)

of Coronado Global Resources, took the form of praise and additional orders for the solution, Jason Lionberger, operations manager, SMJ Fans, said. “They like it,” he said. “It saved them money.”

Buchanan initially reached out to SMJ in search of a more effective scrubber for its dual leg system that would increase overall system efficiency and trim costs. “They were unhappy with the system they had,” Lionberger said. “The main issues they were having is they were spending a lot of money each year on impeller rebuilds. A big concern of theirs was being able to scrub before the fan section without a great deal of loss.”

At the time, SMJ offered a wet scrubbing platform that could serve as a seed idea for a possible solution. “We went out to the mine and met with them and saw what their needs were and came back, mulled things over, and tried to come up with a design that would work,” Lionberger said.

Each leg of Buchanan’s existing system employed one contra-rotating fan unit, consisting of two coupled fan assemblies. Each assembly used a motor rated at 60 horsepower (hp), for 120 hp per unit.

The miner had rigid performance specs for each leg, Lionberger said. “They had one leg running up to the mining face, and then they had another leg going to a different area,” he said. “They had a minimum performance specification that we had to meet while still utilizing their same ducting in terms of diameter, length of run, and changes of direction.”

SMJ hit the drawing board. “We basically had a year of development testing,” Lionberger said. Within that time frame, the company developed and installed a prototype. “We designed a new 32-in. fan that would do this.”

The miner put it to work. Based on the early feedback, “we refined the design adding features and modifying others,” he said.

The resulting double-barreled scrubber features patent-pending technology, “scrubs the air more efficiently” prior to reaching the fan to “reduce wear and tear on the fan system,” and can “provide clean air in any condition,” SMJ reported.

At Buchanan, it resolved the main issues and concerns, and then offered additional benefits, Lionberger said. “We were able to go in and with each leg provide the performance they needed with one motor,” he said. “We were able to go with a single 75 hp fan per leg.”

The solution’s wet scrubbing system is approved under Mine Safety and Health Administration SCH-2G guidelines. It “hydrates particulate dust down to the 0.3 micron-level and removes it from the air stream” upstream of the fan, SMJ reported. It can be designed for 5- to 100-hp fans, offers a maximum rated volume of 25,000 ft³ per minute, and can remove up to 45 lb of dust per hour.

And it can be custom-designed to modify a pre-existing fan system. “This system is a platform,” Lionberger said. “Regardless what performance specifications a customer might have, we can design a scrubber based off of our current platform to fit their needs.”

Resolving those needs to “help improve the lives of the miners” is one of SMJ’s main missions, Lionberger said. “We wanted this system to save the mine money, in terms of maintenance and replacement costs, and to improve the working conditions for the guys underground,” he said. “It is extremely important to filter out that dust so there are less particulates, to quiet down the units, and to limit the amount of maintenance they have to perform.”



Above, CFE engineers install fans and attenuation systems. (Photo: LMS)

Coming to America: Reversible Axial Flow Fans

In Q1 2018, Longwall Mining Services (LMS) entered a distributorship agreement with CFE Technology GmbH, headquartered in Zweibrücken, Germany. Under it, LMS will be the North American mining and power generation sector vendor of CFE's entire line of fan technology, according to Bryon Cerklefskie, LMS vice president, sales and marketing.

The agreement expanded LMS's portfolio of offerings and brings to the North American coal mining market technologies and solutions competitive to those already available, Cerklefskie said. "This rounded out our ability as a company to supply anything from small baby fans up to the biggest of big fans," he said. "They've got fan technology that seems to be little bit more advanced than what other companies have."

For example, CFE's high-capacity axial-flow fans with in-flight variable pitch control can be put into reverse at the push of a button, Cerklefskie said. "You don't have to stop it all the way and adjust blades," he said.

Once in reverse, the fans operate at the desired specifications, Cerklefskie said. "These are highly efficient in reverse, which has to do with how the blade profile is formed," he said.

Norbert Kuhn, managing director, CFE, said the company's reversible mine fans "offer the highest efficiencies for forward and reversed operation."

Push-button reversibility, "which allows changing the pitch angle of the blade by more than 180°," is made possible by "hydraulic adjustment," CFE reported. The blades can be adjusted in mid-operation or at standstill. The solution is designed "to save human life in case of fire, explosion and firedamp in underground mines."

The fans can be made of cast aluminum, CFE reported. They feature horizontally split housing to provide ease of maintenance and accessibility. The blade shafts and main bearings are designed to extend maintenance intervals. Thus, the fans present only moderate capital costs, and generate low energy and maintenance costs, CFE reported.

Beyond axial flow fans, CFE manufactures absorption silencers, acoustic insulation and lagging for use in underground exhaust fan systems.

The perforated baffle silencer is customized to the application. "Designed to provide the requested attenuation at minimized pressure drop, this silencer is appropriate for a wide range of sizes and volumes," CFE reported. "

Acoustic insulation and lagging, which softens the noise from fan casings and ductwork, can also be custom ordered. "The required dampening is considered individually for each application and may include additional acoustic material thickness or anti-drumming foil for more stringent requirements," CFE reported.

CFE's solutions can be for greenfield, brownfield and retrofit projects. The agreement situates CFE to penetrate markets previously closed to them due to economic conditions or the posture of the players already in the market, Cerklefskie said. "They've had a hard time cracking into our market," he said. With the typical ventilation project being plotted and contracted out several years ahead of

launch due to “motor and other component lead time, you’ve got to have a rep that is connected and to know about an opportunity in advance and then chase it for quite some time,” he said.

The agreement also empowers LMS with more competitive comprehensive package offerings. “We can go in and be full-ventilation suppliers for all aspects of mining,” Cerklefskie said. “The nice thing is it doesn’t just apply to longwalls. Any underground mine will use the main ventilation fan.”

The current economic environment is favorable to CFE’s entry to the North American coal mining market, Cerklefskie said. “Really what happened was the downturn, through the previous administration, really choked out a lot of people,” he said. “Now it seems like the environment is flourishing and people want options.”

Many of the materials and components for orders from North American customers will “be sourced in the U.S. and good old Ohio where I live,” Cerklefskie said.

System Simulation Software Upgrade

Howden released VentSim DESIGN version 5, which the company described as “the biggest step change improvement in power and features” since the release of precursor software in 2009. The software enables the rapid creation of simulations and virtual models of ventilation systems and the virtual trial of changes to them.

The upgrade offers increased simulation speed and reduced memory usage, Howden reported.

New features include a Sensitivity and Confidence Analysis tool for airflow, heat and natural ventilation; a Goal Seek tool, which determines the requisite fan pressure to achieve required airflow; and a new simulation engine with a 1,000% increase in solving speed, the company reported.

The software enables the user to model escape routes, map the fastest course to refuge bays and exits, and calculate evacuation times.

The interface offers a “refreshed look and feel,” Howden reported, and includes a Level Wizard, which can “automatically setup a series of default levels based on the model airways.” It also offers a new dashboard to compare differences between logged and simulated airflows.

The system can “connect directly to ventilation network devices” and “manual controls in real time,” Howden reported.

VentSim DESIGN 5 is promoted as ideally paired with VentSim CONTROL, which interfaces with existing infrastructure using open connectivity for real-time control and monitoring of mine-wide ventilation systems.

Consulting Services on Explosive Dust

Camfil APC announced its range of consulting and technical services helps operators ensure their dust collection systems comply with National Fire Protection Association standards. Those services focus on hazard analysis, risk assessment, and fire and explosion prevention control design criteria. The company offers site and equipment assessments, technology recommendations, and in-house lab testing.