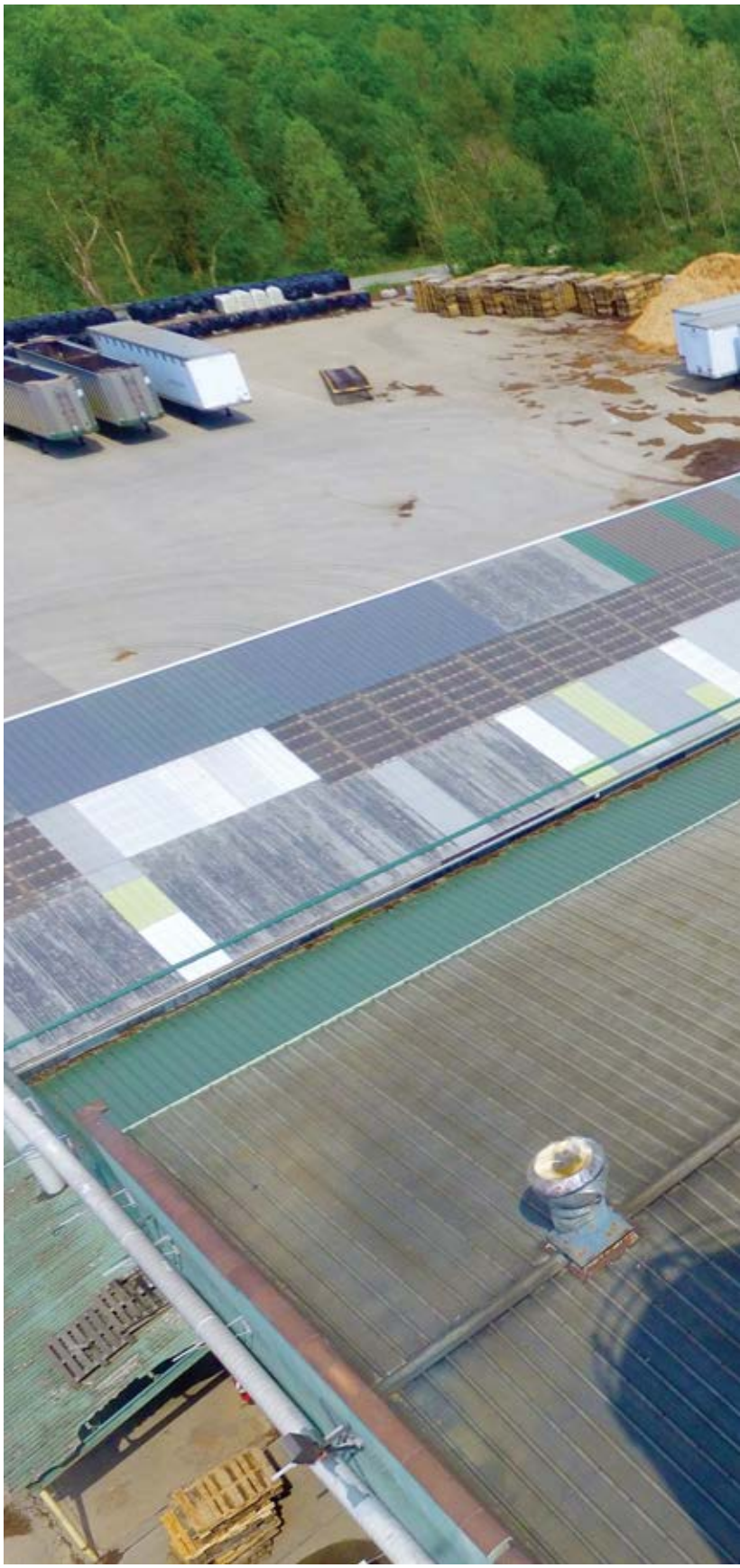
DRIVING DOWN DUST

How one wood pellet manufacturer greatly improved its odds against a secondary explosion by significantly reducing combustible dust from settling above.

BY RON KOTRBA



Two years ago, well ahead of the Sept. 7, 2020, deadline set by the National Fire Protection Association, Greene Team Pellet Fuel Co. contracted Bernard Schonbach of BHS Technical Service LLC to perform a dust hazard analysis (DHA) on its 50,000-ton wood pellet mill in Carmichaels, Pennsylvania. "They didn't find any glaring issues, but it was good to have it done—to truly map out every pneumatic line," says Andy Galis, Greene Team Pellet Fuel's vice president of operations.

The plant is feedstock flexible and receives at least five different types of hardwood material for pelleting, including sawmill cutoffs; green sawdust; wood chips; dry sawdust from hardwood flooring mills, cabinet manufacturers and veneer plants; and whole logs. Part of the DHA included material testing, from green feedstock to dry fines and the pellets themselves.

"We gained a much better understanding of where our concerns should be," Galis tells *Pellet Mill Magazine*. "We found out that some areas we were concerned about, even in an upset condition, had no chance of exploding. It allowed us to focus on where we could have an issue. That was the biggest takeaway."

Greene Team Pellet Fuel's comprehensive dust control and mitigation strategy includes a Mac PowerHouse baghouse

Andy Galis, vice president of operations at the 50,000-ton Greene Team Pellet Fuel Co. in Carmichaels, Pennsylvania, had a Dust Hazard Analysis performed in 2018. Just weeks before, he had several SonicAire dust control fans installed, which he says have been a massive improvement.
PHOTO: GREENE TEAM PELLET FUEL CO.

The Greene Team Pellet Fuel mill takes in at least five types of hardwood, including sawmill cutoffs, green sawdust, wood chips, dry sawdust and whole logs.
PHOTO: GREENE TEAM PELLET FUEL CO.

dust collector, model no. 361. "We bought it used from a hardwood flooring plant in North Carolina," Galis says. "It's massively oversized for what we ask it to do, and that's a good thing as we've added product lines over the years. We try to contain everything we can through that." The mill also employs suction hoods over dusty areas to minimize fines from becoming airborne.

"The other thing we do differently is once our sawdust is dried, we exclusively convey pneumatically—no drag chain or belt conveyors," Galis says. This, he adds, eliminates the possibility of dust leakage from tail pulleys or auger holes. "Those pneumatic lines go to the baghouse for a closed loop [return]," Galis says. "A positive-pressure blower conveys the pellets, and that vessel has suction from another fan on it. That four-inch positive line goes into the vessel that has a suction line on it, so it's not pressurizing the vessel and causing sawdust to leak out of it."

Before reaching the baghouse, all positive-pressure lines in the plant blow into cyclones to help capture the larger particles, leaving only the finest dust particles for the Mac 361 baghouse. Naturally, the cyclone return lines are all negative pressure.

"We also have an explosion-proof industrial vacuum that we use for clean-up of the dust that's not contained," Galis says. "It's impossible to catch everything." Even if Greene Team Pellet Fuel were to contain 99.99 percent of the dust created at its mill, this would still lead to 130 pounds per week of highly explosive dust fines becoming airborne in the plant, according to Galis.

Much like boxing, the secondary explosion in a pellet mill can be the knockout shot in the one-two combo, with the initial explosion acting much like a jarring jab, setting the scene for what's to come. Once an initial deflagration occurs, this can shake dust off the rafters and this newly airborne dust can "blow the top off the building," Galis says.

"We were doing our very best to continually vacuum the rafters, trying to keep the dust down," he says. "But this was a futile exercise without a control system in place. We would completely shut down

power, blow down and constantly vacuum. It was super labor intensive and didn't do that good of a job."

Galis and his team began researching better options. "We were looking at bigger-type fans, like you'd see in a gym," he says. "Then we stumbled upon SonicAire. When we watched the videos and talked to the salesmen, it seemed like a no-brainer. We installed the SonicAire fans in summer 2018, just a few weeks before our DHA. We knew it would be a major improvement, and we didn't want the DHA to focus on the dust settled on the rafters."

SonicAire

Founded by Brad Carr, SonicAire has been manufacturing dust control fans for more than 15 years. Jordan Newton, chief operating officer for SonicAire, says the company had originally focused on lint control at textile factories and commercial laundry facilities. "Brad knew this was bigger than lint and textiles," Newton says. "He knew there were other industries that have problems with dust." Wood processing industries were primed for the taking.

"What our fans offer is similar to a vertical air curtain, but it's flipped sideways to create a horizontal air barrier," Newton says. "We call it 'BarrierAire Technology,' and we trademarked that. We create an air barrier that prevents dust generated in process from reaching the ceiling, which can then be swept up with operations at the floor level so there's no ceiling or deep cleaning needed."

Greene Team Pellet Fuel has four SonicAire dust control fans throughout its facility, and a fifth atop a pellet storage silo. "SonicAire performed a study of our building, took measurements and made recommendations," Galis says. "The fans are not necessarily placed over the machines, but more in a fashion to get overall coverage of the ceiling area. Our 150-foot by 75-foot rectangle build-

Before Greene Team Pellet Fuel installed SonicAire dust control fans, the plant's overhead rafters were laden with combustible dust, which posed a significant risk for a secondary explosion.
PHOTO: SONICAIRE

Installation of SonicAire dust control fans at Greene Team Pellet Fuel greatly reduced dust buildup on the rafters, improving the safety of the facility.
PHOTO: SONICAIRE

ing has an evenly spaced, diamond-shaped layout of four SonicAire fans."

SonicAire fans add another layer of protection to a wood pellet plant's dust mitigation and control strategy, Newton explains. "This really works in any industry," he says. "They can be an additive—you can spot treat with them or do a full system to cover the entire facility. We take care of your overhead spaces to control fugitive dust."

Although Newton has been with SonicAire for the past 10 years, he says he started his career in forensic engineering, focusing a great deal on fire science, and fire and explosion investigations. "Almost all combustible dust events—every single one I've studied—are due to fugitive dust that escapes," he says. "This problem is almost always due to dust being in overhead spaces. If you can prevent that, then you can help protect your facility from those kinds of events."

The SonicAire dust control fans with BarrierAire Technology are designed to move robotically, oscillating up and down, based on the customer's range needs. "They rotate 360 degrees continuously, which creates an overhead barrier," Newton says. "It's really high-velocity airflow, reaching out a good distance."

SonicAire has its own line of controls to manage the fans or, if preferred, they can be integrated into the customer's PLC system. "In accordance with NFPA, they are interlocked with the plant's fire protection system," Newton says. "If there's a fire event, the fans shut down." The integrated control system runs the fans when the plant is operating, and when operations shut down, so do the fans.

More important than the high functionality of SonicAire's fans is the company's team of engineering support, Newton says. "We design a truly engineered system for the customer, based on their individual needs," he says. "We have multiple fan models, mounting equipment, controls, and a full tech support and service team."

Newton adds that SonicAire launched a new product line of fans this year that are more robust and help reduce noise. "They feature new components that add to the longevity and life expectancy of the equipment," he says. "They're really built for highly industrialized settings."

BossTek's DB-M Mini line of misters can help suppress localized dust at transfer points inside a facility.
PHOTO: BOSSTEK

According to Newton, SonicAire's dust control fans are integrated into nearly a dozen pellet manufacturing facilities in North America, including some of the largest. "It's fulfilling to be part of a company I know is making a difference in people's lives," he says. "I hate waste—repeating laborious jobs with no return on investment or added value. It's great to be part of something that does that but also impacts people's lives."

BossTek

Beyond its cool name, BossTek is known for its dust suppression cannons. Mike Lewis, BossTek's vice president of sales, says the company started in 2004 servicing demolition sites, offering its powerful DustBoss cannons to control fugitive dust. Since then, the cannons have been used in a variety of exterior settings, including ports to suppress dust from loading wood pellets onto cargo ships.

Featuring its DustBoss Surge center nozzle jet accompanied by mister rings, DustBoss cannons atomize water to knock down visible dust. "Our nozzles break down the water droplets to between 50 and 200 microns," Lewis says. "The atomized water agglomerates with dust, making it heavy and drop to the ground." Lewis says pellet mill applications for cannons may include loading trucks or railcars, and anywhere there's transfer points on conveyor lines—perhaps even in the woodyard.

In addition to its cannons, BossTek also manufactures a line of rings—like those on the rims of its cannons but separate—and misters. The DB-Rings feature 30 nozzles and may sit at the underbelly of a conveyor or a telescopic shoot, for example, with the product passing through the misting ring as it journeys off the conveyor or down the shoot and into a pile, helping to minimize fugitive dust. For other transfer points, BossTek's misters, the DB-M Mini, are attached to two-foot booms with nine nozzle misting heads and U-bolts for versatile setup. The DB-M Minis mist out about a half-gallon of water per minute, Lewis says.

Although Lewis says he's not aware of any DB-M Minis, DB-Rings or cannons used inside pellet plants—as "the moisture might disturb baghouse filters," he says—Galis says he would consider such machines if Greene Team Pellet Fuel Co. had product dropping in the open air inside the building. "But we don't do that," Galis says. "I've heard of them being used at plants that receive dry sawdust on tipping trailers. When they dump, they have atomized water misted onto the fugitive dust to get rid of it. We don't do that with our dry sawdust though. We bring that in on walking floors, which produces minimal dust."

The pellet industry is no doubt highly competitive, "but we're also one industry," Galis says. For this reason, Galis is willing to share his experience with dust control. "If we lose producers because their plants blow up, or insurance rates go super high and we're lumped in with others who don't have [these controls], then that's not good for us. I think the SonicAire fans are a massive improvement as far as the safety of our plant goes."

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