YOUR GUIDE TO C

Plants can clean up with smaller, greener dust collection

Government agencies in the United States have played a significant part in the dissemination of dust collection equipment. "In terms of air quality, OSHA wants clean air inside for the employees, and EPA wants clean air outside for the public," says Patrick Ostrenga, a retired 34-year veteran of OSHA and founder of Occupational Safety and Health Auditing, Compliance Assistance Services (www.oshacas.com). An important safety issue driving dust collection is the danger of fire and explosion from some kinds of dust.

"I've studied several dust explosions caused by combustible dust," says Ostrenga. "Cornstarch was one that blew in a candy plant. Until the demolition of the old Schlitz/Pillsbury elevator in the late 1990s, none of the old grain elevators were demolished; they all burned. Unfortunately, the fires occurred while they were still operating."

By J. Stanton McGroarty, CMfgE, CMRP, Senior Technical Editor

Fire isn't the only issue driving dust collection. "I personally have a dust collection system in my basement for my saws, sanders, and woodworking equipment," says Ostrenga. "Many woods are irritants, and some are suspect carcinogens. Treated lumber at one time had CCA, an arsenic compound."

SAFETY FIRST

"To provide optimum safety, the dust collection system for a particular plant must take into account a lot of the characteristics of the production system it serves," says Bill Thumme, president of Environmental Solutions (www.dustcollectionpros.com), which sells equipment from Donaldson Torit. "To direct explosions up, there are membranes that tear to protect the plant and equipment. Isolation valves can be installed at the collector inlet and air locks at the dump end to help prevent fires from moving beyond the collector. The inlet structure is typically built of thicker steel than the collector for fire prevention in the plant. The rules are not yet settled for some flammability issues. Also, each factory makes unique demands on the system. That is why a wide variety of options are available."

For spark-generating applications, a range of features and technologies are available, from flame-retardant filter media to spark arrestors and fire sprinkler systems, explains Tomm Frungillo, vice president of Camfil Farr Air Pollution Control (www.camfilfarr.com). If a dust is considered even slightly explosive, the collector will have to be equipped with an explosion venting or suppression system. In these instances, dust collector vessel strength is an important factor in sizing the explosion protection system. A heavy-duty collector, constructed of thicker gauge metal and with a higher pressure rating, will stand up better in the event of a combustible-dust explosion and may enable you to use a simpler and less costly explosion protection system to comply with NFPA standards.

With so many choices, how do you know which type and level of protection is needed? Have your dust tested by an independent lab specializing in combustible dust testing. From there, you can work with your dust collection supplier to analyze your needs and determine the best solution.

Linn Vehslage is the maintenance manager of a factory that produces grinding wheels in South Beloit, Illinois. Not surprisingly, that plant, the Gardner Abrasives factory, a Cinetic Landis company (www.fivesgroup.com/tools), produces a great deal of dust. The dust in Vehslage's plant is very abrasive, being mostly grinding media and binders. Fortunately, it isn't terribly flammable, but Vehslage is a believer in modern dust collection. "If you work with the systems and understand them, they can save you a lot of money and a lot of problems in the plant," he says. "They can cut down on the need for masks and other PPE in large areas of the plant. They also can reduce contamination and wear on electric motors, blowers, and other equipment."

A dust collector can contribute enormously to safety in plants by ensuring that the air is safe to breathe, by reducing fire and explosion hazards, by improving visibility in

COMBUSTIBLE DISCUSSION

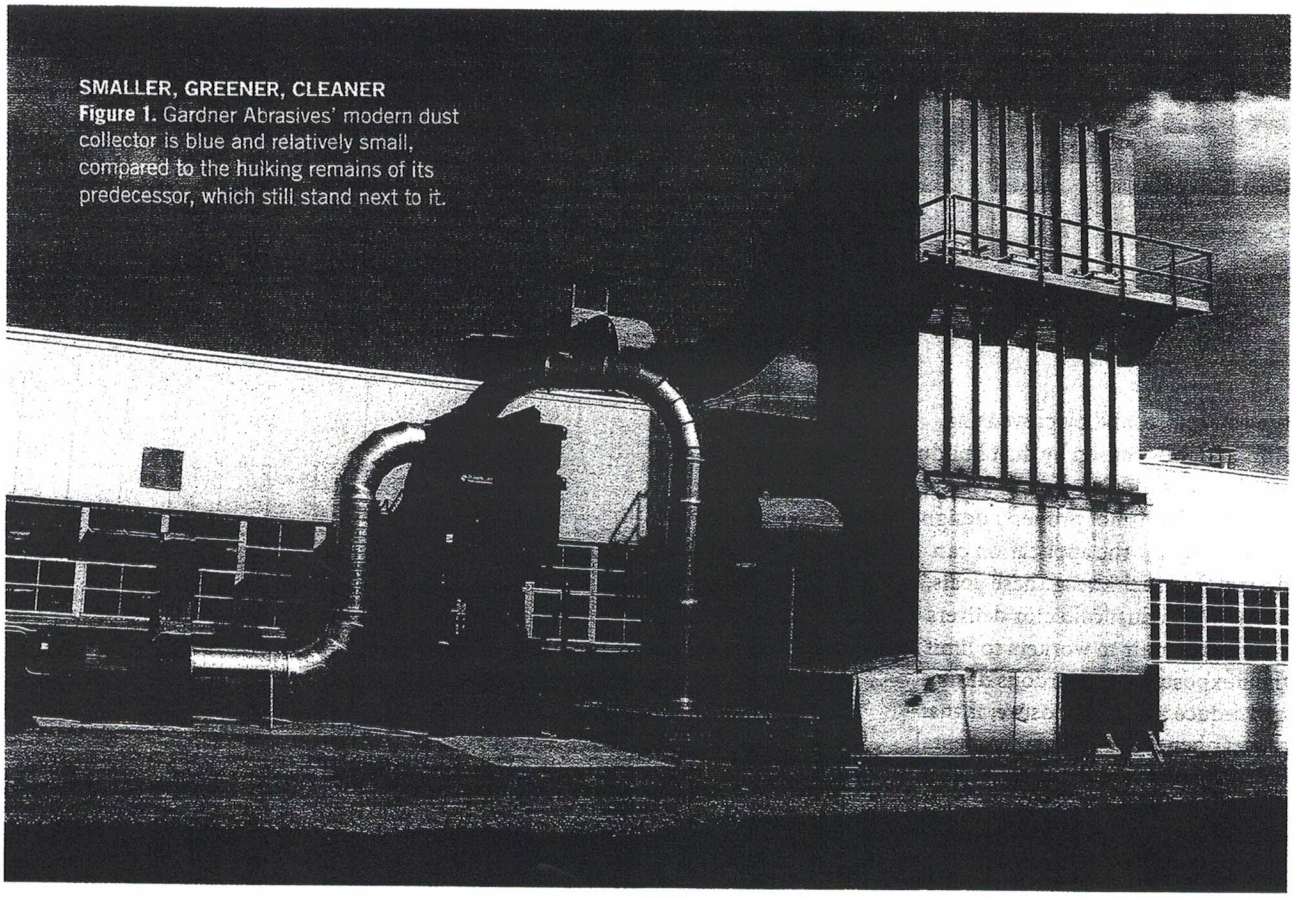
Regulatory agencies still are working on the exact characteristics of dust that will predict fire and explosion. A lively discussion is underway, which should make system specification an evolving science for the next few years. You can read OSHA's summary on combustible dust at http://www.osha.gov/dsg/combustibledust/expert_forum_summary_report.html.

CLEAN, SAFE AIR

the workplace, and by preventing slips and falls caused by dust buildup, says Frungillo. "Conversely, a dust collector that is not properly designed or is wrong for the application can detract from achieving these goals," he says. "If a dust collector delivers clean indoor air to workers to limit their exposure to hazardous dusts and reduce allergy exposure, is that a safety benefit or an environmental one? It's both, and it's often difficult to separate these two issues."

WHAT'S NEW IS NEW

When a system can deliver cost reduction, improved equipment reliability, and a safer, more comfortable workforce, those are exciting developments. Improvements keep coming with newer technology (Figure 1). The new Donaldson Torit dust-collection unit at Gardner is much smaller and more economical than the old one, and it takes a lot less maintenance. Vehslage remembers the baghouse that used to be full of bags that were 6 to 12 ft long and had a life measured in months. Today's unit has filters that look more like oversized automotive air cleaners than the old-time long, skinny bags that would fill up with dust. Back then, a bag change was a process that lasted for hours and tied up several maintenance people. The new system uses a backflow of pulsed compressed air, as needed, to clear the filters and prolong their lives. The filter change now is more like an annual event, and it takes far less cost and labor to execute.



SMALLER, GREENER, CLEANER
Figure 1. Gardner Abrasives' modern dust collector is blue and relatively small, compared to the hulking remains of its predecessor, which still stand next to it.

"I'll give you a real good buy on the leftover bags," offers Vehslage with a grin. "We're never going to use those things again, and they've probably expired anyway."

Over the past 30 years, cartridge-style dust collectors have overtaken traditional baghouses as the preferred technology for industrial dust and fume collection, emphasizes Camfil Farr's Frungillo. "With their smaller footprints, higher filtration efficiencies, and safer change-out methods, cartridge collectors have made dust collection technology more accessible, more affordable, and more reliable for a wide range of applications," he says.

"The modern dust-collector industry is a hotbed of technological development," explains Frungillo. "We're seeing advances all the time. In dust collector filtration media and filter designs, we've seen the advent of open-pleat media that save energy and increase filter service life. Also, relatively new to the market are user-friendly programmable controllers that provide more reliable pulse cleaning of dust collector filters. The controllers send a signal to clean filters only when dirty, saving on compressed air while further extending filter life and reducing maintenance costs. Also, recently introduced is an integrated safety monitoring filter that functions simultaneously as a flame arrestor. It can provide a new and cost-effective method of explosion protection for many combustible dust applications, while also providing backup filtration for recirculating dust collection systems."

INCREASINGLY TIGHT AIR QUALITY AND SAFETY REGULATIONS ARE BEING ISSUED FROM THE EPA, OSHA, THE NFPA, AND LOCAL ENFORCEMENT AGENCIES.

Increasingly tight air quality and safety regulations are being issued from the EPA, OSHA, the NFPA, and local enforcement agencies, says Frungillo. "Tighter regulation means the use of a high-efficiency dust collector is very often a requirement, not an option," he says. "The same is true of deflagration and fire protection ancillary equipment that is now required in most dust-collection applications. That has changed quite a lot from 30 years ago."

Sustainability is perhaps the newest issue, adds Frungillo. "As an environmental product that cleans up dust and fumes, every dust collector is to some degree green," he explains. "But is it designed to minimize energy usage in the plant? Does it utilize long-life components that will reduce waste over time? Is it manufactured using sustainable materials and processes? Customers are increasingly looking for equipment that will contribute to sustainability, and this is an area where dust collector manufacturers will need to keep raising the bar."