

# W MATERIAL HANDLING WHOLESALE

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## **Dust Explosions: Rare but costly**

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A glance at statistics from the world's largest property insurance company, FM Global, reveals that the average manufacturing facility experiences a process-related dust explosion once every twenty years. At first this might seem comforting, until you understand the damage a dust explosion can inflict. Rare footage of actual events, of buildings gutted and roofs blown off, rival Hollywood's best visual effects—except that they're very real, very deadly and very expensive.

Such dramatic images generate concern for workers, company assets and public perception among major manufacturing, industrial, pharmaceutical and food production company CEOs. Until recently, however, discussion of dust explosions was off limits outside most corporate offices.

Stuart Wood, Corporate Manager for Environmental Safety & Health (ESH) at Wm. Wrigley Jr. Company, one of the largest confectionery manufacturers in the world, is vitally aware of the role of environmental safety, based on his position as worldwide point man for Wrigley's efforts to maintain a safe work environment for all their employees, as well as protecting their physical assets and process revenue sources from serious harm.

Starting as a process-oriented quality assurance manager, he eventually inherited the company's safety program, accepting the head safety job at Wrigley's Plymouth plant in the United Kingdom.

“Plymouth was the first time I'd worked in the confectionery industry, and they had a number of safety issues that I hadn't had much exposure to in my previous positions. Dust explosions were the biggest one by far, and I was fascinated by the subject.”

During the manufacture of chewing gum, mills grind sugar from a silo fed into a hopper and cycled through the milling process before being run through appropriate screens and sent on to various plant processes. A suppression system using Halon—a powdered extinguishing agent, once common but no longer used—was already installed on the milling process, with the hoppers, mills and feed bins all protected. The event that ignited his smoldering interest in dust explosion protection happened just two weeks after he arrived in Plymouth.

“When we had two activations in just two weeks, it took about 30 people nearly four days to straighten up and get the process running again. At the time, sugar went into almost every one of our products, and since Halon was not a food grade suppressant, an activation of the suppression system would result in a shutdown of the mills and require the entire system to be stripped down for cleaning.” The cost and loss of production in such an event was staggering.

Wood began taking classes in explosion protection system design, observing controlled explosion demonstrations that drove home the complicated and unpredictable nature of the phenomenon, and was eventually offered the job of Corporate Safety Manager in Chicago.

“What’s the most important thing to a publicly traded business like Wrigley? It’s our reputation as a company that cares about our people, the environment, and the communities around our plants. We can insure against hard losses, but we can’t insure our good reputation,” Wood underscores.

When retrofitting equipment was recommended, many plant engineers pointed to dust collectors in enclosed production areas and sealed rooms where standard venting was simply not an option.

During a plant safety audit in Salzburg, Austria, the factory engineer showed Wood a publication about a new passive explosion suppression device called Q-Rohr. When asked by Wood to contact German manufacturer Rembe about a U.S. distributor, he was given a phone number for Cv Technology, a West Palm Beach, Florida-based whose company provides expert engineering and consulting services for process evaluation and explosion protection system design.

Wood asked Cv Technology present the new technology to the Chicago factory engineers, confident that the equipment cost would be comparable to the overall cost of venting, suppression systems, or any of the other accepted methods of dust explosion protection.

While U.S. approval of the Q-Rohr was being granted by FM Global and the National Fire Prevention Association (NFPA), the final decision to begin installing the Q-Rohr at Wrigley facilities came after Wood investigated all the available options in explosion protection.

“Suppression is reliable, but it wasn’t cost-effective. Even though food grade suppressants are available now, it can still be expensive when you look at process downtime costs,” he states.

According to David Cvetas, CEO of Cv Technology, in comparative analysis, the total price tag of owning and maintaining active suppression systems was demonstrated to be as much as twice as high as passive suppression technology like Q-Rohr over a four-year period. Today, the Q-Rohr remains the only fully approved passive explosion suppression device in the world.

Cvetas emphasizes that the biggest key to cost-effective explosion protection is mixing and matching available protection strategies and systems with each application based on hard-nosed engineering data. While not an inexpensive device, the Q-Rohr remains far less expensive than redesigning an entire plant process when a dust collector is not too optimally located for venting.

Wood explains that Cv Technology typically does an evaluation and initial risk assessment, specifies and supplies equipment, Wrigley engineers the installation, and everyone participates at start-up to ensure all systems are working properly.

The Q-Rohr came into its own at Wrigley by allowing retrofitting of existing equipment. “In a room with twenty people and a process working, the noise might scare the life out of a few people,” says Wood, “but ultimately they’ll be safe. From an insurance perspective you’re not going to damage the facility or the building either.”

Process downtime can also reduce from days or weeks to hours. “People have to see and experience a dust explosion for themselves, with their own products and ingredients,” he says. “Once they realize what even a small amount can do, and can extrapolate that into what’s possible with their entire process running at full tilt, that’s very convincing.”

According to Wood, building a business case for protection systems is crucial, and often the need has to be demonstrated through a long education and awareness process. While it is possible for companies

with no direct experience to go to insurers like FM Global and evaluate the explosion data, the looming danger to their process, their bottom line and their company reputation doesn't become real until it happens in their own process—and by then it's usually too late.

“We may only have a major dust explosion every twenty years, but if that one event costs millions of dollars in fixed repair and process downtime costs, and untold losses in terms of the company's employees and reputation, then it is certainly worth tens of thousands of dollars now to keep it from happening. At Wrigley, we think it's vitally important to be safety-conscious, quality-focused and forward-thinking in everything we do,” Wood concludes.

*For more information about Cv Technology contact them by mail at: 11320 Fortune Circle, Suite G18; West Palm Beach, Florida 33414-8742; by phone: (561) 753-9556; by fax: (561) 753-9563; or check them out on the Web at: [www.cvtechnology.com](http://www.cvtechnology.com).*

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