

SAFETY AT STAKE

Managing Combustible Dust in the Workplace

by Brad Carr

The issue of combustible dust in saw mills and other places where wood is processed is such a dire one that Congress has renewed its focus on the topic with a new bill introduced earlier this year. HR691, the Worker Protection Against Combustible Dust Explosions and Fires Act of 2013, seeks to require the secretary of labor to issue an interim set of standards regulating the control of combustible dust and to finalize a permanent ruling within three years of the interim standard. The bill has been referred to the Subcommittee on Workforce Protections for review.

The goal of the bill is self-explanatory. However, a look at the history of the issues surrounding this bill is worthwhile for critical insight.

Regulatory History Overview

_____The risks of combustible dust are not new. Back in 2003, there was a rash of catastrophic dust explosions that killed 14 workers. The Chemical Safety and Hazard Investigation Board (CSB) took charge and subsequently issued a report in 2006 that identified 285 separate combustible dust incidents between 1980 and 2005 that killed a total of 119 workers and injured a total of 718.

The CSB's conclusion was far-reaching, recommending that OSHA issue a standard of tolerance for combustible dust accumulation based on National Fire Protection Association (NFPA) standards. NFPA has a series of standards for various industries. The generic standard is NFPA 654, Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing and Handling of Combustible Particulate Solids. The standard for the wood industry is NFPA 664, Standard for the Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities.

Fast forward to 2008. In February of that year, a catastrophic combustible dust explosion at a sugar plant in Georgia killed 14 workers and seriously injured more than 38 workers. This tragedy brought the dangers of combustible dust onto the national stage. In response, Congress issued H.R. Bill 5522, a bill sponsored by the U.S. House of Representatives requiring OSHA to enforce NFPA dust standards.

In essence, this bill allowed OSHA to put teeth to NFPA's standards in a systematic and rigorous way. OSHA took this directive and established a National Emphasis Program (NEP). Part of the new activities included the requirement of inspectors to look at combustible dust levels even if the inspection was precipitated by other concerns (OSHA Directive CPL 03-00-008). From 2007 to 2009, more than 1,000 inspections for combustible dust were conducted on the federal and state level. The largest number of inspections — 25 percent — was in the wood products industry. The status report on the Combustible Dust National Emphasis Program stated that the total citation penalty fines proposed by OSHA neared \$15 million during that time. Obviously, OSHA meant business.

More recently, in March of this year, one wood pellet company was fined \$47,710 for fire and combustible dust hazards in two of their manufacturing plants. This new momentum to OSHA's activities has been kick-started with the new HR691 because legislators were not satisfied with the progress made from HR 5522. The gist of HR691 is to set up timelines by

which official standards must be accepted and enforced: an interim timeline states that “not later than one year after the date of the enactment of (HR691), the Secretary of Labor shall promulgate an interim final standard regulating occupational exposure to combustible dust hazards.” [Section 3(a)]. The bill then calls for the final standard to be set no later than 18 months after issuance of the interim standard. Both of these regulatory standards are based on those first set by NFPA standards (654, 664, etc.).

Canada Comes on Board

The U.S. is not alone in taking combustible dust seriously. Canada has also suffered tragedies from dust explosions. In the last four years, five explosions have been linked to wood dust, causing extensive damage to all the facilities. In 2012, dust explosions and fires in two mills killed four people and injured 41 workers. As a result, WorkSafe BC is paying more attention to regulations and compliance. In Spring 2012, a fire industry task force composed of government and manufacturers issued a “dust directive order” to maintain mill safety. In this directive, entitled Combustible Dust Hazards Awareness and Safeguarding, definitions and housekeeping principles were established. Some highlights include:

- Dust control would occur through a combination of “passive containment, engineering controls and housekeeping”
- Recommended housekeeping principles direct that “clean up should be scheduled in relation to the extent that dust could accumulate” and should “...provide coverage for all workspaces in the facility and include walls, beams etc.”

This group also issued a follow up on combustible dust directive orders to sawmills to assure ongoing compliance, reinforcing that “The Directive Order is a legally binding direction to undertake the steps described in the order, and failure to comply may result in enforcement action being taken... [and] at the time of the inspection the employer must have taken significant steps in complying with the Directive Order.”

WorkSafeBC has inspected 172 facilities for compliance with combustible dust since April, 2012. From those inspections, 167 follow-up site visits were conducted, with an additional 631 orders issued to assure that mills are in compliance with the directive order.

What Matters Most?

_____ Basically, all this means that wood processors need to pay close attention to the dangers of combustible wood dust or risk heavy fines - and the safety of their employees.

So what are the most important details? Let’s take a closer look at some of the specifics of NFPA 664 that clearly focus on the issues that matter most:

- A specific requirement is made in Chapter 4.2.1: “A deflagration hazard shall be determined to exist where the layer of accumulated fugitive wood dust on upward-facing surfaces exceeds 3.2 mm (1/8 inch) over five percent of the area or 93 m² (1,000 sq. ft.), whichever is smaller. For smaller areas, a deflagration hazard shall exist where the accumulated fugitive deflagrable wood dust layer is equivalent to 3.2 mm (1/8 inch) over five percent of the area. ”

Keep in mind that 1/8 inch is the size of the diameter of the tip of an average pen. The practical reality is that this requirement means there is a zero-tolerance approach to dust buildup in a plant. Wood processing plants must find ways to deal with this immediately or risk penalties for non-compliance.

Keeping the workplace tidy is an important step in keeping facilities safe. NFPA 664 states that wood processors must be aware of the following:

- Dust layers 3.2 mm (1/8 inch) thick can be sufficient to warrant immediate cleaning of the area.
- The dust layer is capable of creating a hazardous condition if it exceeds five percent of the building floor area.
- Dust accumulation on overhead beams and joists contributes significantly to the secondary dust cloud and is approximately equivalent to five percent of the floor area. Other surfaces, such as the tops of ducts and large equipment, can also contribute significantly to the dust cloud potential. Attention and consideration should also be given to other projections, such as light fixtures, that can provide surfaces for dust accumulation.

Clearly, the standard encourages facilities to comply with these recommendations through frequent and regular cleaning. But what are workable ways to accomplish that?

Managed vs. Engineered Approaches

There are two different strategies to address OSHA's concerns: a managed solution or an engineered solution. In fact, the NFPA standards refer to a managed solution, which has been the status quo to date. It's important to take a look at each approach and identify their strengths and weaknesses.

A *managed approach* means that personnel or third-party businesses clean the overhead structures on a continuing basis. This has been the conventional approach to controlling combustible dust. One benefit of a managed approach is that there are low upfront costs: contracts are set up for ongoing payments that become part of annual operating expenses.

There are also other issues to consider with a managed approach, however. There is risk to personnel for the overhead cleaning. The levels of cleanliness in the facility vary based on the proximity to the scheduled cleaning time. For example, if overhead cleaning is scheduled monthly on the 15th of the month, the combustible dust has had time to accumulate by the 14th of the month, making it possible for the plant to be out of compliance with OSHA regulations and putting the safety of employees at risk. Even if a plant owner or manager was diligent about regular cleaning, the cyclical nature of the buildup is inevitable with a managed approach. Also inevitable is lost production due to the necessary shutdown of the plant during cleaning.

In contrast, the *engineered approach* is based on the assumption that technology can be leveraged to automate cleaning processes and continuously protect against the risks of combustible dust accumulation.

Two Engineered Solutions

With an engineered solution, an enterprise-wide system is needed. This enterprise-wide solution often combines technologies, depending on the size of the wood processing plant. There are two different types of engineered solutions. The first technology is *localized filtration*. With this, the equipment captures the combustible dust by either vacuuming or suctioning. This approach is often needed, but the reality is that it can't be used alone because localized filtration can't capture every particle.

The second technology is *barrier technology*, which prevents combustible dust from accumulating on overhead structures. With barrier technology, a robotic clean fan automatically maintains OSHA compliance throughout the plant. With this approach, there is a one-time deep clean of fugitive dust, and once that dust is removed, no new dust is allowed to accumulate

again. Often there is synergy between the filtration and the barrier technologies and they can be effectively used together in one facility to assure ongoing compliance.

With either engineered approach, there are higher costs for implementation. But these are one-time costs, as opposed to the ongoing costs associated with a managed solution. An engineered approach also allows for automated, controlled cleaning that doesn't interfere with production. Depending on the sophistication of the specific technology, it also delivers consistently higher levels of cleanliness for ongoing compliance to government regulations and for employee safety.

Evaluating the Options

_____ So how do you know which approach is the smarter, more affordable way to meet OSHA regulations? Facility managers and plant owners should evaluate the overall cost for any solutions based on a range of variables, including:

- Initial cost
- Operating cost
- Safety of personnel cleaning overhead structures
- Ongoing labor cost
- Employee morale
- Disruption to normal production
- Energy usage

Whichever approach is chosen, managers must be mindful of the increased need to pay attention to the dangers of combustible dust. Action must be taken. Nothing is more important than protecting the lives of employees.

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