



# Wisconsin Agri-Business News Quarterly

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By Tom Bressner,  
WABA Executive Director

Greetings once again from the staff at WABA! We hope the Summer has been good for you and your businesses. While way too much of our time at the Association was spent dealing with regulatory issues, the Summer has been a good one for us as well.

Speaking of regulatory issues, in mid-August, WABA sent a news blast to the membership on an OSHA revision concerning Process Safety Management on agricultural retail exemptions for facilities handling hazardous chemicals. In their attempts to lift the exemption for ag facilities, this could create excessive, timely and expensive paperwork and management practices to be put in place in facilities such as anhydrous ammonia handling facilities. Jim is attending a seminar in Owensboro, Kentucky to get our arms around the extent of this regulation interpretation change. You can expect to receive updated information on this issue in the coming days.

Transportation issues have continued to be hot topic items. We participated in an Agricultural Transportation Summit in August and participated in a Transportation Roundtable with Senator Tammy Baldwin in early September. As far as current logistics are concerned, for the most part, agricultural transportation issues in Wisconsin are much better than they were a year ago. Hopefully it continues to be that way for the upcoming harvest season as well. However, long term funding issues for transportation infrastructure, both state and federal, are FAR from being solved.

We also sent you a news blast a few weeks ago reminding you of the November 1st enforcement date for the Lighting and Marking section of the 2014 Implements of Husbandry legislation. In some cases, you might need to revise some of the lighting and reflective strips on your implements of husbandry equipment in order to meet the new regulations. Most of the revisions will need to be made by farmers on equipment such as planters, disks, etc..., but we have some wide equipment in agribusiness as well. Anhydrous tool bars are the first to come to mind. So be sure to look at your inventory of equipment and make any changes necessary to meet the lighting and marking regulations.

# How Should My Facility Evaluate and Address Hazards from Combustible Dust?



By Christopher Frendahl and  
Brian Edwards, PE

There are two major motivators at work for plant managers when it comes to ensuring worker safety in any industry: Avoiding the potential for a catastrophe and preventing the possibility of severe fines from the Occupational Safety and Health Administration (OSHA). When both of these risks exist at a plant, action must be taken – both for the sake of worker safety and for the sake of facility finances. Combustible dust is an issue that presents both of these challenges to a number of industries. Hazards associated with combustible dust have been largely overlooked until recently. However, episodes of severe dust explosions have led to the development of more concrete regulations from OSHA and the National Fire Prevention Association (NFPA). The risks associated with a combustible dust explosion as well as the issuance of stiff fines by OSHA as of late have brought the problem of combustible dust to the head of facility agendas.

To understand how an industrial facility should address the issue of combustible dust, a number of topics should be addressed:

1. What is OSHA doing to address the issue?
2. How does a facility determine if they are at risk of a combustible dust incident?
3. How does a facility develop a strategy for mitigating the hazards?

Once a facility understands all of these points, actions can be taken to minimize the likelihood of a catastrophic event and eliminate its exposure to significant fines from OSHA.

## Increase in OSHA Regulation

A catastrophic incident at a sugar factory near Savannah, GA changed the way that OSHA and other industries throughout the country view the dangers of combustible dust. In early 2008, a dust explosion at the facility caused 14 deaths, numerous injuries, severe building damage that led to a huge economic fallout for the company, and vast liability concerns. Because of this, OSHA has begun to prioritize its focus on hazards associated with combustible dust in order to prevent such an incident from happening again.

Prior to this incident, there were no specific OSHA regulations regarding the dangers that combustible dust present. However, in March 2008 OSHA immediately responded to the severity of the Savannah, GA incident by reissuing its Combustible Dust National Emphasis Program (NEP) that has been used to establish an inspection schedule for facilities at which combustible dust is likely to pose a hazard. Since the NEP was reissued, OSHA has issued thousands of violations totaling in the millions of dollars.

OSHA's increase in regulation did not stop there. In late 2009, OSHA released an Advanced Notice of Proposed Rulemaking (ANPR) to officially begin the process of creating specific regulations relating to combustible dust and facilities associated with such dust. Meetings were held in 2009 and 2010 to discuss four main points: National Fire Protection Association (NFPA) standards, the scope of the proposed rule, economic impact of the rule, and hazard mitigation. The rulemaking process began to slow down as the meeting of a Small Business Regulatory Enforcement Fairness Act (SBREFA) panel has been postponed several times leading to OSHA downgrading the standard from "Pre-Rule stage" to "Long-term action." However, OSHA's most recent Spring 2015 regulatory agenda upgraded this combustible dust standard back up to "Pre-Rule stage" and the SBREFA panel is expected to meet in February, 2016.

While OSHA has been slowly working to create their own standard regarding combustible dust hazards, NFPA is consistently updating their combustible dust standards. OSHA commonly refers to NFPA standards when citing combustible dust hazards during their facility inspections, so it is imperative that plant managers are kept up-to-date with the NFPA standards as well. Most of these NFPA standards are industry specific – for example, wood processing and wood-working facilities refer to NFPA 664 while agricultural and food processing facilities would refer to NFPA 61. However, NFPA recently issued a new standard, NFPA 652, to align these industry-specific standards to create a unified standard that can be used by all facilities in any industry sector.

The companies affected by the combustible dust standards may be broader than most people think. The OSHA NEP and ANPR identify industry categories which have had frequent combustible dust expo-

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sions or which have the potential for such explosions. However, many stakeholders have called for the upcoming OSHA regulations to apply to any industrial facility that handles combustible dust, rather than singling out specific industries. Regardless of how OSHA's combustible dust rule comes out, all facilities that generate or handle combustible dust should take steps to mitigate the hazards associated with it.

## Characterizations of Combustible Dusts

When working to mitigate the hazards of combustible dust flash fires and explosions, the first step that all facilities should take is to determine the nature of any dusts present on-site. According to OSHA, combustible dust is often either organic or metal dust that is finely ground into very small particles that present a fire or explosion hazard when suspended in the air. NFPA states that "any material that will burn in air" in a solid form can be explosive when the particle size is reduced. In addition, some normally noncombustible materials, when reduced to a finely ground state, present a potential for a serious fire or explosion.

A number of factors, including dust particle size, shape, and moisture content, will determine a dust's combustibility. Sometimes, the combustibility of a material can be found on its Safety Data Sheet (SDS), but more often than not, analytical testing is required to conclusively establish whether the dust is combustible or not. There are several types of tests that can be conducted on dust to evaluate its combustibility properties. Understanding which tests should be conducted is important to ensure that all necessary data is available to engineers and safety professionals, but also to keep costs down by preventing unwarranted, and sometimes expensive tests from being performed.

OSHA's NEP details a series of tests that classify whether a dust is combustible and determine the severity of the hazard. The NEP includes basic tests, such as particle size analysis, moisture content, percent combustible material and percent combustible dust, but it also includes more specialized tests to determine specific qualities including the dust's Minimum Ignition Energy (MIE), Minimum Ignition Temperature (MIT), Minimum Explosible Concentration (MEC), Resistivity, Maximum Deflagration Pressure (P-max), and Maximum Normalized Rate of Pressure Rise (Kst). The results of these tests can decisively tell a facility whether the combustible dust standards apply to it or not and can help engineers gauge the significance of an explosion that could result from a particular material.

With such a variety of analytical tests, how does a facility decide which tests to request from the testing laboratory? After all, specialty testing of dust can be expensive, especially if a facility handles a number of different types of dusts and particulates. The most important question to answer before deciding which tests to perform is "What is the purpose for having these tests conducted?" If it is simply to determine whether or not a specific dust is combustible, then conducting a Go / No-Go screening test would be a good starting point. However, if it is relatively certain that a dust is combustible, such as with dry sawdust or sugar, this testing would only confirm suspicions and would provide little useful data.

In these instances where a facility knows that a dust is combustible, it is important for the facility to assess the likelihood and/or severity of a deflagration or explosion event as this is key data required in conducting a detailed hazard analysis. MIE, MIT, MEC and resistivity analyses can be conducted to assess the likelihood of a deflagration or explosion while P-max and Kst tests would provide useful data in determining the potential severity of a combustible dust incident (note that both Pmax and Kst data is derived from the same testing procedure). Table 1 (on the next page) illustrates which tests should be selected in certain situations.

## Combustible Dust Hazard Analysis and Control

Once the facility has determined the combustibility of any dust present, the entire nature of the process and the layout of the equipment, structures, and utilities should be evaluated. Because OSHA is already conducting facility inspections and issuing violations based on the NEP, it is important for facilities to conduct their own self-evaluations to ensure compliance with the NEP and prepare for the formal regulations that are being developed.

Facilities can identify and eliminate hazards associated with combustible dust by reviewing the actions that OSHA has already taken. During its inspections, a majority of the violations issued by OSHA under the NEP relate to facility housekeeping measures, hazard communication, proper use of Personal Protective Equipment (PPE), electrical hazards, and general duty clause citations, which often refer to NFPA standards. In order to address these problem areas, a few of the

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Table 1: Combustible Dust Tests and Their Uses

Reasons for Conducting Test	Type of Test					
	Go / No-Go Screening	MEC	MIT	MIE	$P_{\text{max}}/K_{\text{st}}$	Resistivity
Determine if a dust is combustible	✓					
Evaluate the likelihood of a deflagration or explosion	✓	✓	✓	✓		✓
Identify Class II locations		✓	✓	✓	✓	✓
Identify potential ignition sources		✓	✓	✓		✓
Assess need for explosion protection		✓			✓	
Design of explosion protection					✓	
Select compatible materials for ductwork and process equipment					✓	✓
Determine grounding requirements				✓		✓

common acceptable measures employed by facilities include, but are not limited to:

- Implementing dust control measures that prevent dust from accumulating in work areas and duct work, including regular, strict housekeeping measures;
- Ignition control and hot work programs that eliminate the potential for sparks in areas where dust has accumulated;
- Employee training to educate workers on the dangers associated with combustible dust and to instruct them on proper practices for identifying and eliminating hazards; and
- Installing protection measures, including spark detection and suppression systems to prevent explosions from happening, and explosion venting and isolation devices to prevent primary explosions from creating much larger secondary explosions.

Based on responses from several industrial sectors, it appears that the need for explosion protection or suppression systems is the highest concern for plant management due to the fact that these controls can often be expensive and may require process layout modifications. In order to decide which controls would provide the greatest safety benefit, a facility should conduct a detailed hazard analysis of the processes handling combustible dust and all areas

of the facility affected by dust. Material testing data, process flow rates, equipment configuration, material handling procedures, structural integrity, ventilation, dust collection, and numerous other factors should be evaluated to assess the likelihood and potential severity of a flash fire or explosion. Once the likelihood and severity of hazards have been assessed, a facility can establish a priority for addressing the individual hazards present. In many cases, it has been found that relatively inexpensive and easily implemented controls can provide a significant hazard reduction. Alternatively, if a number of deflagration protection controls are needed, but installing these controls at once is not economically feasible, the prioritization of hazards allows the facility to develop an effective implementation schedule that will optimize hazard reduction efforts.

### Looking Ahead

OSHA's requirements under the NEP and upcoming rule may apply to much more than what a facility typically considers to be a hazard. NFPA standards, which are frequently cited by OSHA and will likely form a strong basis for the upcoming combustible dust standard, indicate that while housekeeping measures are important, hazard analyses, engineering

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controls, preventative design, and employee training are essential for proper dust explosion hazard preparations.

The days of combustible dust hazards flying under the radar of OSHA regulations are over. In early 2009, OSHA issued a letter to over 30,000 facilities regarding combustible dust hazards, calling it an issue of "critical importance" and offering basic guidance on minimizing these hazards. While this letter served as an information and advisory message, OSHA is certainly calling industry attention to the issue of combustible dust and urging facilities to act without delay. Both OSHA and NFPA are developing new regulations and standards to further address the hazards associated with combustible dust.

Without a doubt, new regulations requiring potentially costly protection and preventative measures are the last thing that industrial facilities need. But what

a company needs even less are employee injuries or fatalities resulting from a combustible dust related fire or explosion or extensive fines handed down by OSHA for not taking steps to comply with the NEP and impending combustible dust regulations. The time to act on OSHA's NEP and upcoming regulations is now – before the danger of catastrophe and hefty fines becomes a reality.

Links:

(1) Combustible Dust Consulting from Conversion Technology, Inc.:

<http://www.comdustsafety.com>

(2) CTI Home Page:

<http://www.conversiontechnology.com/>

(3) CTI EHS Blogs:

<http://www.conversiontechnology.com/blog/> 



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