Training the Trainer: How to Deliver an Effective Safety Talk on Combustible Dust Hazards

By the time you finish your training presentation, workers should understand combustible dust hazards and how to guard against them.

Get Their Attention

Let workers know what's at stake. Explain that dust isn't just a breathing danger; it can also cause explosions and fires. List examples of combustible dusts commonly contained in workplaces like:

- Aluminum, magnesium, and other metal dusts.
- Wood dust.
- Coal and other carbon dusts.
- Plastic dusts.
- Cotton and other textile dusts.
- Organic dusts such as sugar, flour, paper, and soap.

Point out which combustible dusts are present in **your** workplace.

Make It Real

Tell workers that hundreds of workers have perished in dust explosions. Provide some recent examples:

- **July 2025:** Dust explosion and fire at Nebraska wood pellet manufacturing facility kills three.
- **August 2014:** Metal dust explosion at metal parts plant in Eastern China kills 68.
- **April 2012:** Saw dust explosion at Canadian sawmill kills two, injures dozens.
- **December 2010:** Titanium dust explosion at West Virginia chemical plant kills 10.
- **February 2008:** Sugar dust explosion at Georgia refinery kills 14, injures 36.
- **January 2003:** Rubber dust explosion at North Carolina drug plant kills six, injures 36.
- **May 2002:** Rubber dust explosion at Mississippi recycling facility kills six.

Remind workers that dust explosions annihilate not only lives but also jobs.

Make It Personal

Hopefully, these sobering fatality statistics will have the desired effect. But remind workers that it's not just about numbers. Every one of these victims was a flesh-and-blood person with a family. To drive home the message, tell the story of a real-life victim named Shawn Boone, a 33-year-old worker who died as a result of burns suffered in an October 2003 aluminum dust explosion at the Hayes Lemmerz cast aluminum automotive wheel plant in Huntington, Indiana.

As relayed by his sister Tammy and other family members, the stirring story of Shawn's death and its impact on the family he left behind is sure to resonate with your workers and make them understand that dust explosions aren't about statistics and body counts but human grief.

Anecdote Sample

The Fateful Night

The phone rang late October 29, 2003. I was nearby and heard Mark say, 'There was a blast at Hayes Lemmerz.' I immediately thought 'not again' then my mind switched to Shawn. 'Oh my God, it's Shawn, it's Shawn, isn't it"

Jeff (a coworker and friend) stayed with Shawn until he was rushed to Fort Wayne. Unable to contact family members, Mark called the St. Joseph hospital and found that they were treating a young unidentified male with no body hair and third degree burns over most of his body. Ultimately Shawn was identified by apparent weight and body structure alone.

My family drove five hours. All the while, I was thinking to myself, praying to myself it wasn't Shawn and feeling sorry for the family of whoever that burn patient was. Arriving at the hospital, my heart sank and as I walked in, I felt my legs give way. My mother was waiting at the elevators to warn us that Shawn was barely recognizable and led the way to his room.

On the way to the room, we met the hospital Chaplain, who expressed his condolences and cautioned us about Shawn's war-like condition. I thought to myself, 'Shawn is a tough cookie; he'll do fine; I'll take him home and care for him'. Walking in, I saw Shawn's face peeking out of the blankets. I gave everyone a hug and gained the courage to confront Shawn. My God, he was swollen and his face was splitting but I could still tell it was him. I could still see his cute little nose and the remnants of his light red eyebrows. I started to lift the blankets and my mother stopped me. The doctors had refused to bandage his body; they told her there was nothing left to save.

Mom proceeded to tell me they had waited on us. Waited on us for what, I wondered' They planned to take Shawn off his breathing apparatus. I didn't want them to take Shawn off. I loved him, I would take him home, I would take him if they had to take his arms and legs and I couldn't believe they would even suggest that. I knew Shawn wouldn't want to live that way but I didn't care. Maybe he changed his mind or maybe he didn't know how much we all loved him or how much we would miss him.

We did let Shawn go that morning. It was the hardest thing I ever had to do. I still feel the guilt of killing my brother; he may have been that one with the power to overcome and we did not give him that chance.

The Explosion

How did this happen?

Shawn and a couple of others had gone in to relight the furnace (this was normal for Hayes because they had fires on a daily basis) and they all decided to stick around a few minutes to make sure everything was okay. Things seemed fine, so they went back to gather tools. Shawn was directly behind the furnace with his back toward the furnace when the first explosion occurred.

Some stated that Shawn got up and started walking toward the doors (this can't be confirmed). Then there was a second and more intense blast. The heat from the blast was hot enough to melt copper piping (1084.62 øC/1984.32 øF). Shawn did not die instantly like one would think. He lay on the building floor smoldering while the aluminum dust continued to burn through his flesh and muscle tissue. The breaths that he took while in the building burned his internal organs. Thank God, the blast took his eyesight. My brother had no nerve endings and was a fleshy carcass. Shawn was still conscious and asking for help when the ambulance took him.

The Kind of Person Shawn Was

Shawn was 33, never married and had no children. He was a great host, loved company and would do anything for anyone. Shawn enjoyed his nieces and nephew; he loved to entertain them buying a pool and an old tractor for their entertainment. He bought my oldest daughter her first car and took her out driving many times. He was especially thrilled when I had my son calling him 'The Boy'.

Shawn was proud of his county home, his English bulldog (Duchess) and the fact that he was going back to school. Shawn took pride in everything he did and enjoyed life to its fullest. He enjoyed football, racing, model trains and digging things up from anywhere to see if they could be fixed and given to someone in need. Shawn was always trying something new just to see if he could do it and was childlike in his excitement. Shawn was a kind and loving son, brother, uncle, and friend.

The System & Accountability

Shawn's employer would not return calls and/or mail, probably because they had been advised by their lawyers to have minimal contact. IOSHA (Indiana OSHA) issued Safety Orders alleging that Hayes Lemmerz International-Huntington, Inc. violated the Indiana Occupational Safety and Health Act. The fines totaled $42,000, representing seven serious violations, to be paid to IOSHA in three payments of $14,000, with the last payment being made no later than 60 days past May 10, 2004. Hayes Lemmerz was also ordered to make a donation to the St. Joseph burn unit.

OSHA concluded Hayes Lemmerz did not show plain indifference or intentional disregard in Shawn's case. They came to this conclusion by consulting with the Labor Board and lawyers. Indiana workers or their surviving family members cannot sue their employers in civil court but may bring a claim before Indiana Workers Compensation Board and have a civil law judge review the case and determine a financial settlement. Shawn was not eligible for any such payment because he was unmarried and had no children.

All these decisions about my brother's death were made without one word to his family or any input from us. Shawn valued higher education and children; I felt he would have rather a donation be given for college scholarships. There are still no new or planned regulations for flammable dust and there were no moneys paid out in Shawn's behalf making it cheaper and easier to kill someone than it is to fix an issue.

A workplace death is so different from any other. Normally, if someone is killed you know someone is responsible, they will go to trial and be held accountable. In a workers death, there is almost never any accountability.

Explain the Danger

Having engaged their attention, tell workers how dust explosions happen. First, explain what combustible dust is, namely, finely ground particles of a solid material that get into the air or on surfaces and which can cause a fire or explosion if they're ignited. Next, tell workers that you need five elements to cause a dust explosion:

1. **Combustible dust:** The particles must be a material that explodes or causes a fire if ignited, e.g., dusts from metals, wood, cotton, sugar, plastic, coal, etc..
2. **Ignition source:** There must be heat, friction, electricity, or something else to ignite the dust.
3. **Oxygen:** The area in which the dust particles are present must contain oxygen.
4. **Dispersion:** There must be a dust cloud that's wide and dense enough to produce an explosion if it's ignited.
5. **Confinement:** If the first four elements are present, the ignition of the combustible dust will cause what's called "deflagration," or rapid combustion. And if deflagration takes place in an area that's enclosed, like a building, room or vessel, it may release pressure that's high enough to produce an explosion.

Explain that dust explosions often trigger additional or secondary explosions. In effect, the first explosion ignites other combustible dusts in the air producing an even more powerful explosion.

Tell Them How to Control Dust Hazards

Emphasize that you need all five elements for a dust explosion to occur. Explain that two of these elements are hard to avoid—oxygen, since it's in the air and confinement since the materials that generate combustible dusts are typically used in a building, room or other enclosed space. The key, then, to preventing dust explosions is to concentrate on the three elements that can be controlled. More precisely, you need to ensure that combustible dusts present in concentrations that can cause deflagration aren't set off by ignition sources.

Control of Ignition Sources

Explain the controls workers can take to keep ignition sources away from combustible dusts, including:

- Using appropriate electrical equipment and wiring.
- Controlling static electricity such as by bonding of equipment to ground.
- Not smoking or using sparking tools in areas containing combustible dusts.

Housekeeping

Explain that a little dust can cause a big explosion. 1/16 inch, roughly twice the thickness of a dime, may be enough. Stress the importance of housekeeping in preventing dangerous dust accumulations. List examples of good housekeeping practices, such as:

- Performing regular dust inspections.
- Inspecting not just open areas but out-of-the way areas where dusts can build up.
- Checking equipment, fixtures, ducts, and venting.
- Regularly sweeping or vacuuming dusts from floors and surfaces.
- Making sure that vacuums used to remove combustible dusts are safe for that purpose and aren’t an ignition source.
- Using cleaning methods that produce minimum amounts of heat and friction.

End Talk with Emergency Response

Explain that the last line of defence is being able to respond safely if dust fires or explosions do take place, including with regard to evacuation, fire suppression, and use of fire extinguishers.