HAZARD ALERT

Combustible Dust

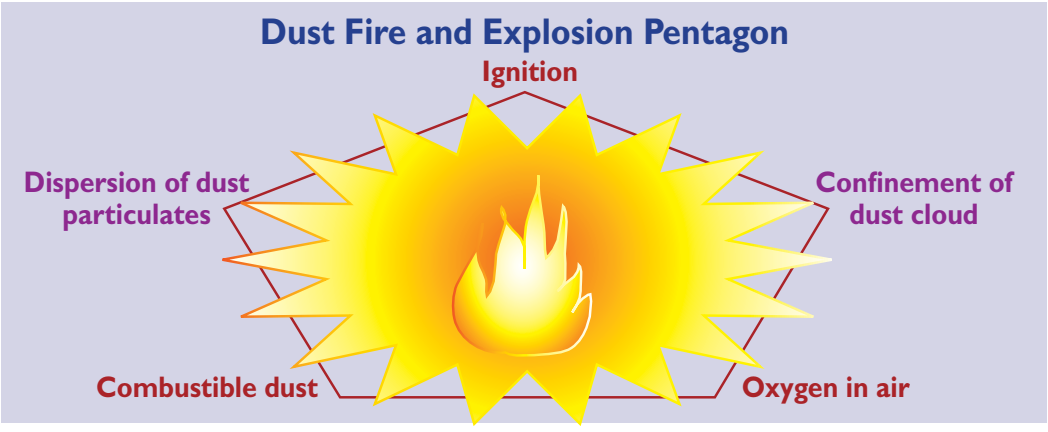
In February 2008, sugar dust ignited, and there was an explosion and fire at the Imperial Sugar Dixie Crystals plant in Georgia. This explosion caused 13 deaths and left others critically injured with severe burns. Fortunately a disaster of this magnitude has not occurred in Oregon, although injuries and fatalities have occurred because of a wood-dust fireball, dust flash from powder-coating filters, and a grain-dust explosion.

A combustible dust explosion hazard may exist in a variety of industries, including food (e.g., candy, starch, flour, feed), plastics, wood, rubber, furniture, textiles, pesticides, pharmaceuticals, dyes, coal, metals (e.g., aluminum, chromium, iron, magnesium, and zinc), and fossil-fuel power generation. The vast majority of natural and synthetic organic materials, as well as some metals, can form combustible dust. NFPA's Industrial Fire Hazards Handbook states "any industrial process that reduces a combustible material and some normally noncombustible materials to a finely divided state presents a potential for a serious fire or explosion."

The primary factor in an assessment of these hazards is whether the dust is in fact combustible. Any "material that will burn in air" in a solid form can be explosive when in a finely divided form. Different dusts of the same chemical material will have different ignitability and explosibility characteristics, depending upon many variables such as particle size, shape, and moisture content. One possible source for information on combustibility is the Material Safety Data Sheet (MSDS). However, do not rely on it as a sole source of information. In some cases, additional information such as test results will be available from chemical manufacturers.

Consideration should also be given to elements needed for a fire (the familiar fire triangle) and a combustible dust explosion:

1. Combustible dust (fuel)
2. Ignition source (heat)
3. Oxygen in air (oxidizer)
4. Dispersion of dust particles in sufficient quantity and concentration
5. Confinement of the dust cloud



Oregon OSHA

Oregon OSHA
www.orosha.org
800-922-2689

DEPARTMENT OF CONSUMER & BUSINESS SERVICES

Hazard alerts provide information on unusual safety or health hazards or unusual or hazardous materials or practices. For more information contact the Oregon OSHA Standard and Technical Resources Section at 503-378-3272, toll free at 800-922-2689 or visit our Web site at www.orosha.org.

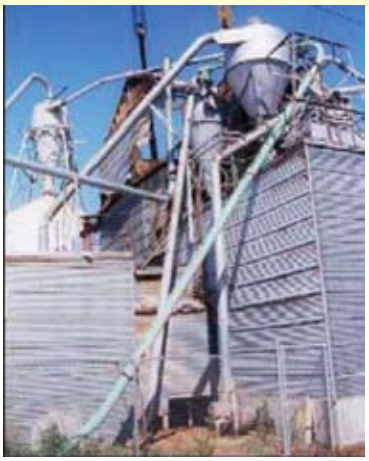
OR-OSHA 2993 (6/08)

Oregon OSHA

Combustible Dust, continued

Facilities should carefully identify the following in order to assess their potential for dust explosions:

- Materials that can be combustible when finely divided
- Processes which use, consume, or produce combustible dusts
- Open areas where combustible dusts may build up
- Hidden areas where combustible dusts may accumulate
- Means by which dust may be dispersed in the air
- Potential ignition sources



The top of the factory roof was destroyed in the wood-dust explosion. *— Oregon*

Photo courtesy of the local fire department.

The employer's responsibility is to train workers. Workers are the first line of defense in preventing and mitigating fires and explosions. If the people closest to the source of the hazard are trained to recognize and prevent hazards associated with combustible dust in the plant, they can be instrumental in recognizing unsafe conditions, taking preventative action, and/or alerting management.

While Oregon OSHA standards require training for certain employees, all employees should be trained in safe work practices applicable to their job tasks, as well as on the overall plant programs for dust control and ignition source control. They should be trained before they start work, periodically to refresh their knowledge, when reassigned, and when hazards or processes change.

Employers with hazardous chemicals (including combustible dusts) in their workplaces are required to comply with 1910.1200, the Hazard Communication standard. This includes having labels on containers of hazardous chemicals, using material safety data sheets, and providing employee training. Other standards also apply.

Resources:

OSHA SHIB 07-31-2005 — www.osha.gov/dts/shib/shib073105.html

Here is a link to the Imperial sugar plant dust explosion: http://savannahnow.com/node/444690

February 2008

Imperial Sugar plant explosion on the Savannah River in Port Wentworth, GA.