

**SPECIAL POINTS  
OF INTEREST:**

- Dust Explosion
- Elements of Dust Explosion
- Dust Control
- Ignition Control
- Damage Control
- Training

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# Hats ON for Safety

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## Got Dust ?

**Dust Explosion** A dust explosion is the fast combustion of dust particles suspended in the air in an enclosed location. Coal dust explosions are a frequent hazard in underground coal mines, but dust explosions can occur where any powdered combustible material is present in an enclosed atmosphere.

OSHA initiated the Combustible Dust National Emphasis Program (NEP) in October 2007 to inspect facilities that generate or handle combustible dusts that pose a deflagration/explosion or other fire hazard.

### Elements of Dust Explosion

The addition of the latter two elements to the fire triangle creates an “explosion pentagon”. If a dust cloud is ignited



### Combustible Dust

Any combustible material (and some materials normally considered noncombustible) can burn rapidly when in a finely divided form. If such a dust is suspended in the air in the right concentration, it can become explosive. The force from the explosion can cause deaths, injuries and destruction of entire buildings. Materials that may form combustible dust include

wood, plastics, paper, metal, coal. In many accidents employers and employees were unaware a hazard existed.

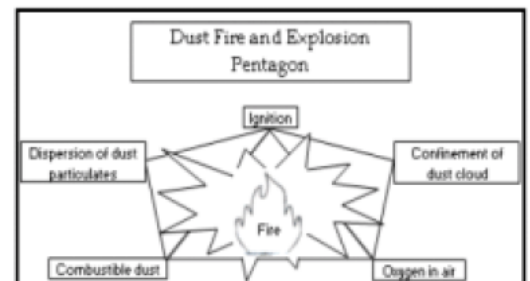
### Elements of a Dust Explosion

1. Combustible dust (fuel)
2. Ignition source (heat)
3. Oxygen in air (oxidizer).

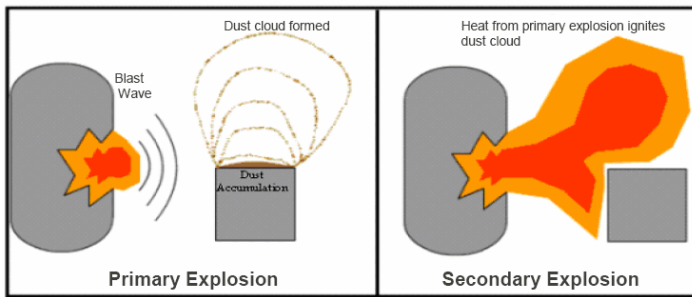
### Additional Elements Needed:

4. Dispersion of dust particles in sufficient quantity and concentration
5. Confinement of dust

within a confined area, it burns very rapidly and may explode. The safety of employees is threatened.



**Explosion Pentagon**



- Utilize surfaces that minimize dust accumulation
- Provide access to all hidden areas to permit inspection
- Inspect for dust residues in open and hidden areas regularly
- Clean dust residues regularly

If one of the elements of the explosion pentagon is missing, a catastrophic explosion cannot occur. Two of the elements are difficult to eliminate—oxygen (within air) and confinement of the dust cloud (within processes or buildings). The other three elements can be controlled.

### DUST CONTROL

- Minimize the escape of dust from process equipment or ventilation system
- Use dust collection systems

- Use cleanings that do not generate dust clouds, if ignition sources are present.
- Only use vacuum cleaners approved for dust collection
- Locate relief valves away from dust hazard areas
- Develop and implement a hazardous dust inspection, testing, control program (in writing)

Some information for this newsletter was taken from *combustible dust info*; *OSHA.gov*; *Wikipedia*

### IGNITION CONTROL

- Use appropriate electrical equipment and wiring.
- Control static electricity.
- Control smoking, open flames and sparks.
- Control mechanical sparks and friction.



- Separate heating surfaces and systems from dust.
- Proper use and type of industrial trucks.
- Proper use of cartridge activated tools.
- Adequately maintain all equipment.

### DAMAGE CONTROL

- Separation of the hazard (isolate with distance)

- Segregation of the hazard (isolate with a barrier)
- Deflagration venting of building, room, or area.
- Pressure relief venting for equipment
- Provision of spark/ember detection and extinguishing systems
- Explosion protection systems
- Sprinkler systems

### Training

Workers are the first line of defense. If the people closest to the source of the hazard are trained to recognize and prevent hazards, they can be instrumental in recognizing unsafe conditions, taking preventative action, and/or alerting management. Employees should be trained before they start to work, periodically to refresh their knowledge and when

hazards change.

Employers with hazardous chemicals (including combustible dust) are required to comply with the Hazard Communication standard. This includes having labels on containers of hazardous chemicals, using MSDS and providing employee training.

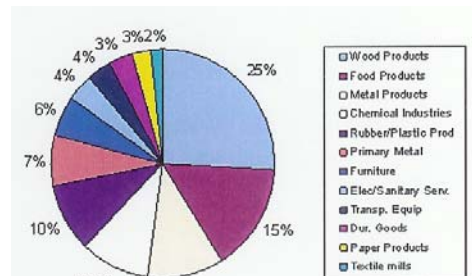


Figure 2. Types of Industries Inspected by Percent

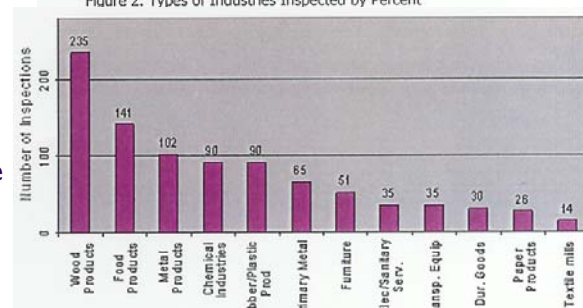


Figure 3. Types of Industries Inspected by Number