

CTA Acoustics, Inc: Combustible Dust Fire and Explosions

Corbin, KY, February 20, 2003

Facilitator Resources

See the overall CSB Facilitator Guide here: <https://mwc.umn.edu/>

Link to 2006 Combustible Dust Study by CSB:

https://www.csb.gov/assets/1/20/dust_final_report_website_11-17-06.pdf?13862

Link to the CSB report: <https://www.csb.gov/cta-acoustics-dust-explosion-and-fire/>. Review the final report; as it is 127 pages in length it may be feasible to access it on the internet and provide selected pages for each participant. There is no 2-page summary. It is recommended that the following pages be copied for review (at a minimum):

- cover sheet,
- 13-14 (Introduction),
- 31-43 (Incident Description)
- 46, 47, 49 (Graphics of Dust Explosion)
- 60-79 (Incident Analysis),
- 90-92 (Root and Contributing Causes),
- 93-95 (Recommendations)
- 11-12, 15-16 (Executive Summary, Key Findings may be reserved for review)

OSHA web resource:

<https://www.osha.gov/dsg/combustible-dust/guidance.html>

Legal resolution: <https://www.skofirm.com/news/cta-acoustics-accepts-verdict-jury-finds-borden-chemical-100-percent-liable/>

2015 SDS: <http://www.anamet.com/msds/en/mounting/200-X.pdf>

Graphics taken from the report are on the last page of this Guide.

- Dust explosion pentagon

- Table of particle sizes

- Burning increases with decreasing size (log, kindling, explosion)

- Mechanism of dust fire/explosion

Key Points and Discussion Questions and Answers follow on the next pages.

Key Points

- Seven killed, 37 injured as a result of an explosion in a facility where phenolic resins were used to manufacture acoustical insulation for the auto industry.
- The process had been changed because of a malfunctioning temperature control indicator. At the time of the incident, an oven was operated with the door open.
- The firewalls and physical barriers were insufficient barriers to the blast, leading to spread to nonproduction areas of the facility.
- The resin supplier knew of an explosion involving a similar resin in 1999 and did not communicate lessons learned or the explosion potential of the product to CTA.
- CTA management was aware of the hazard but did not implement sufficient controls or inform workers.
- Work practices were not designed to address the buildup of combustible dust on surfaces.
- Kentucky OSHA did not identify a hazard during comprehensive inspections; insurers did not identify the hazard during inspections.
- Kentucky State Fire Marshal had not inspected the plant since construction.
- Particle size 10-55 microns, in the combustible range.

Questions

1. What would have helped the workers prior to the first explosion?
2. What management decisions/omissions contributed to this situation?
3. What OSHA regulations could be applied in this facility?
4. What can be done to help assure that there is not another occurrence?

Representative Answers

1. The workers were not trained in the hazard of the resin dust. Line cleaning work included work practices that are not recommended for combustible dusts (use of metal tools, compressed air). Maintenance workers tried repeatedly to fix the temperature controller and only after a year ordered a new one; in the meantime, manual control of the oven was allowed by opening it, as needed. Worker shift logs did not prompt investigations. When the cleanup crew was downsized, cleaning duties were shifted to production workers.

2. Redesign of the ventilation system took a year, as the dust built up. Delay in ordering controller. No prompt incident investigations, despite detailed shift logs of small fires. Electrical boxes not sealed after found to be too dusty by insurance carrier. Fans were used during daily cleaning, adding to the dispersion of dust; semi-annual cleaning not documented. NFPA 654 not applied, despite reference in MSDS; company did not have a copy of the consensus standard. Hazards not shared with workers.

3. There is no OSHA combustible dust standard. Housekeeping and the General Duty Clause are generally used when a combustible dust hazard is identified. PPE, NFPA 654 and electrical standards (NFPA 70) also apply. Kentucky, a state-plan State could adopt a separate standard, but none was in place.

4. Training is needed for employees on OSHA and consensus standards. Management action in response to shift logs could be documented using internal audits. Assure building design and modification are consistent with NFPA 654. Close attention to housekeeping with proper tools and PPE to eliminate accumulation of dust.

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See the listing of recommendations here,
https://www.csb.gov/recommendations/?F_InvestigationId=3530 that required actions
from the following:

American Chemistry Council (ACC) (1 Recommendations)

Borden Chemical, Inc. (3 Recommendations)

CertainTeed Corporation (2 Recommendations)

CTA Acoustics, Inc. (8 Recommendations)

FM Global (1 Recommendations)

International Code Council (ICC) (1 Recommendations)

Kentucky Office of Housing, Buildings, and Construction (2 Recommendations)

Kentucky Office of Occupational Safety and Health (2 Recommendations)

National Fire Protection Association (NFPA) (1 Recommendations)

Society of the Plastics Industry- Phenolic Division (1 Recommendations)

Acknowledgement

The Midwest Consortium developed this exercise under cooperative agreement number U45 ES 06184 from the National Institute of Environmental Health Sciences.

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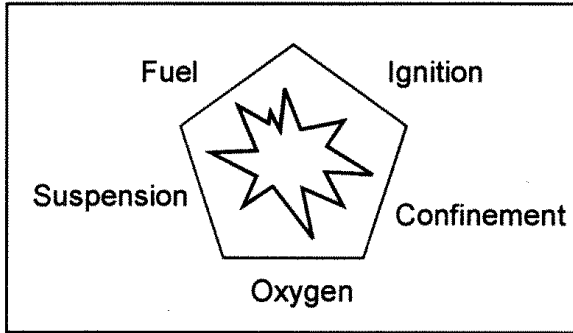


Figure 10. Dust explosion pentagon.

Table 1
Particle Size of Common Materials

Common Material	Size (microns)
Table salt	100
White granulated sugar	450–600
Sand	50+
Talcum (baby) powder	10
Mold spores	10–30
Human hair	40–300
Flour	1–100

Source: Filtercorp International Ltd.

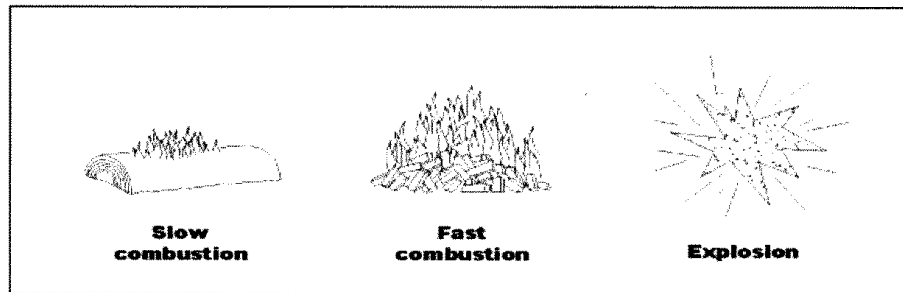


Figure 11. Burning increases with increasing surface area.

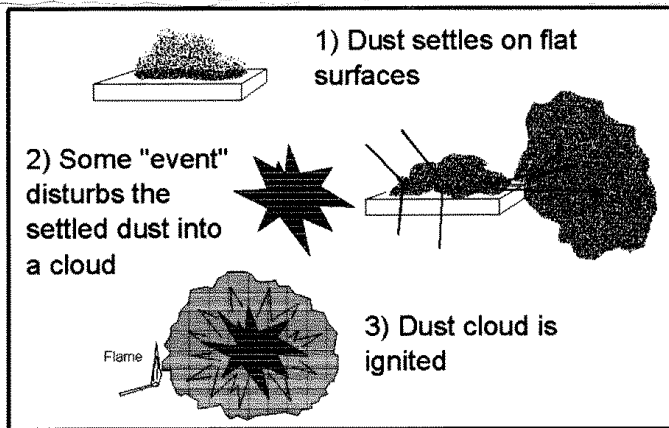


Figure 12. Mechanism for a dust fire or explosion.

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REPORT NO. 2003-09-I-KY
FEBRUARY 2005