

Hayes Lemmerz international Aluminum Dust Explosion

Huntington IN, October 29, 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/hayes-lemmerz-dust-explosions-and-fire/>. Review the final report; as it is 116 pages in length and there is not a 2-page summary, it is recommended that the following pages be copied for review (at a minimum):

- cover sheet,
- ix and x (executive summary),
- 1 (Background)
- 37 (figure of dust inside duct),
- 40 (gas cylinders as torpedoes),
- 72-74 (key findings),
- 95 (historical events),
- 96 (incident timeline).

Section 5, Regulatory Analysis provides important context.

OSHA web resource:

<https://www.osha.gov/dsg/combustibledust/guidance.html>

Key Points

- One killed, six injured as a result of an explosion in a facility where cast aluminum alloy wheels were manufactured.
- The explosion destroyed the dust collection equipment outside the building and damaged equipment inside the building and lifted a portion of the building roof above one furnace and ignited a fire that burned for several hours.
- Aluminum dust from the chip system was tested and shown to be explosive.
- The manufacturing process resulted in the production of fine particles of aluminum.
- Previous fires and deflagrations in the scrap processing area were not reported by employees or investigated by management.
- NFPA requirements in the purchase specifications were not applied in the design and installation of the dust collector system.
- Written maintenance procedures and training were not in place.
- Indiana fire inspectors were not trained to recognize combustible dust hazards.
- Prior inspections by Indiana OSHA did not identify dust accumulations as a hazard.

Questions

1. What would have helped the workers prior to the 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 aluminum dust or the operation and maintenance of the chipper dust-collection system. Previous fires were not reported by the workers.

2. The installation of the dust collector was not done according to NFPA 651 that was included in the directions at purchase. There was not adequate separation between the dust collector and the foundry building per NFPA 484. Management did not take actions after previous fires.

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 and electrical standards may also apply. Indiana as a state-plan State could adopt a separate standard, but none was in place.

There are industry standards that provide guidance (see pages 65 and 66 of the final report).

4. A range of training is needed—workers, inspectors, fire code enforcers, management. Program development and (most importantly) use for the maintenance of the equipment.

See the listing of recommendations here, https://www.csb.gov/recommendations/?F_InvestigationId=3528 that required actions from the following:

Aluminum Association, Inc. (2 Recommendations)
Fire Protection Research Foundation (1 Recommendations)
Hayes-Lemmerz International (HLI) (2 Recommendations)
Hayes-Lemmerz International- Huntington, Indiana (5 Recommendations)
Indiana Department of Homeland Security (1 Recommendations)
Indiana Occupational Safety and Health Administration (1 Recommendations)
International Code Council (ICC) (1 Recommendations)
International Union, United Automobile, Aerospace and Agricultural Implement (1 Recommendations)
National Association of State Fire Marshals (1 Recommendations)
National Fire Protection Association (NFPA) (1 Recommendations)
North American Die Casting Association (1 Recommendations)
Premelt Systems (1 Recommendations)
Risk and Insurance Management Society (RIMS) (1 Recommendations)
United Steelworkers of America (USWA) (1 Recommendations)

Acknowledgement

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