

How to Reduce Risks of Combustible Dust: New Standards, New Technologies

PELICE Conference

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JUST OUTSIDE THE BOX



Tinkerbell didn't realize the fairy dust was classified as combustible.

Jordan Newton

Professional Engineer

**VP of Innovation & Engineering
SonicAire**



What's the issue to be solved?

**Fugitive dust can KILL
when it accumulates**



Combustible Dust Explosions



Results? Serious tragedies

US Alone: 1980-2005

- * 281 combustible dust incidents in a 25 year period
- * 718 injuries
- * 119 deaths

2008-2012

- * Another 50 incidents

Owners have been found criminally liable

Government Reaction to Solve Problems

HR 522 – May 2007

HR 5522 – April 2008

HR 691 – February 2013

Who are the players?



NATIONAL FIRE PROTECTION ASSOCIATION

The leading information and knowledge resource on fire, electrical and related hazards



**Occupational Safety
and Health Administration**



Dust control innovations.

NFPA 654

- **The former umbrella standard**
- **1/32" over 5% of area not to exceed 1000 ft²**
- **Bar-joist surface = > 5%**



NFPA 664

- 1/8" over 5% of area not to exceed 1000 ft²
- Bar-joist surface = > 5%



NFPA 652

New Umbrella Standard

GOAL: Minimum general requirements for managing hazards posed by combustible dust

- Focus on hazard awareness, identification, management, mitigation, and prevention



NFPA 652

- Directs users to industry/commodity specific NFPA standards
- Requirements of 652 shall be applied in addition to industry/commodity specific standards

NFPA 652 Additions

- All companies that generate, process, handle or store combustible dust need a Dust Hazard Analysis (DHA)
- This DHA is retroactive
- A DHA can be phased in no later than three years from the effective date of the standard (8/7/18)



What is involved in DHA?



Step 1 – Identify all processes connected with combustible dust

- List process lines where dust could exist
- Identify all pieces of equipment

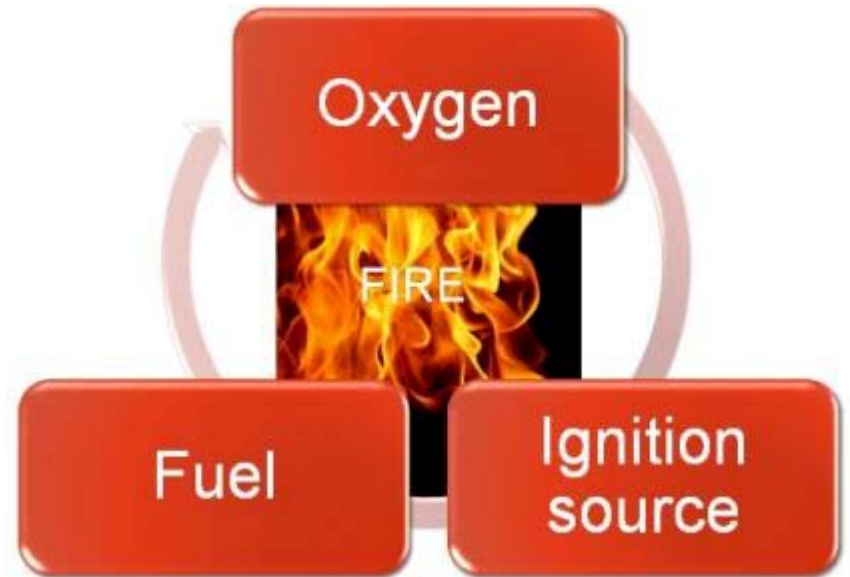
What is involved in DHA?

Step 2 - Identify locations where dust can accumulate

- Inspect all areas where dust exists
- Identify amount of accumulation
- Pay particular attention to:
 - Overhead structures: pipes, joists, beams, ductwork
 - Drop ceilings
 - Determine potential where dust can be released in abnormal conditions

What is involved in DHA?

**Step 3 - Determine
the ignition sources**



What is involved in DHA?



Step 4 - Quantify the risk

- Evaluate each area and piece of equipment
- Determine severity of risk
- Remediation methods must be identified for risks

What is involved in DHA?

**Step 5 – Examine and
evaluate current safety
measures**



Other Important Requirements

- Identify individual thresholds of allowable dust accumulation
- Develop housekeeping methods with documentation
- Develop a Management of Change (MOC) plan
- Overhead clean fans are sited as a credible housekeeping solution (Chapter 8 – Hazard Management: Mitigation and Prevention)



Additional Important Topics

Annex A: Explanatory Materials

A.7.2.1... “... we always assume an ignition source is present unless we can prove one cannot exist...”

“The majority of property damage and personnel injury is due to fugitive dust accumulation in the building.... The elimination of accumulated fugitive dust is CRITICAL and the single most important criterion for a safe workplace.”

Additional Important Topics

- “Elimination of accumulated fugitive dust is the **single most important criterion** for a safe workplace.” (A.7.2.1)
- Cannot forget overhead dust accumulation (A.8.2.6.3.1)
- Engineering design controls are preferable for difficult to clean areas. (A.8.4.2.6.1)

OSHA Enforcement

- 2007 OSHA published “Combustible Dust National Emphasis Program” (NEP)
- 2008 H.R. 5522 “Worker Protection Against Combustible Dust Explosions and Fires Act” – stalled
- 2009 NEP reissued as a stronger initiative with NFPA 654
- 2013 H.R. 691 issued – stalled

*The OSHA
Inspector just
left! and it doesn't
look good!!*

*But, I Didn't
Think OSHA
would ever get
to Us....*



OSHA and NFPA 652

- Enforcing industry specific standards
- OSHA allowed to increase penalty fines across the board
 - Some analysts expect increases as high as 82%

BOTTOM LINE: Keep accumulation as low as possible.

What are Solutions for Fugitive Combustible Dust? Managed vs Engineered

Manual cleaning... A Managed Solution



Strengths of Managed Approach

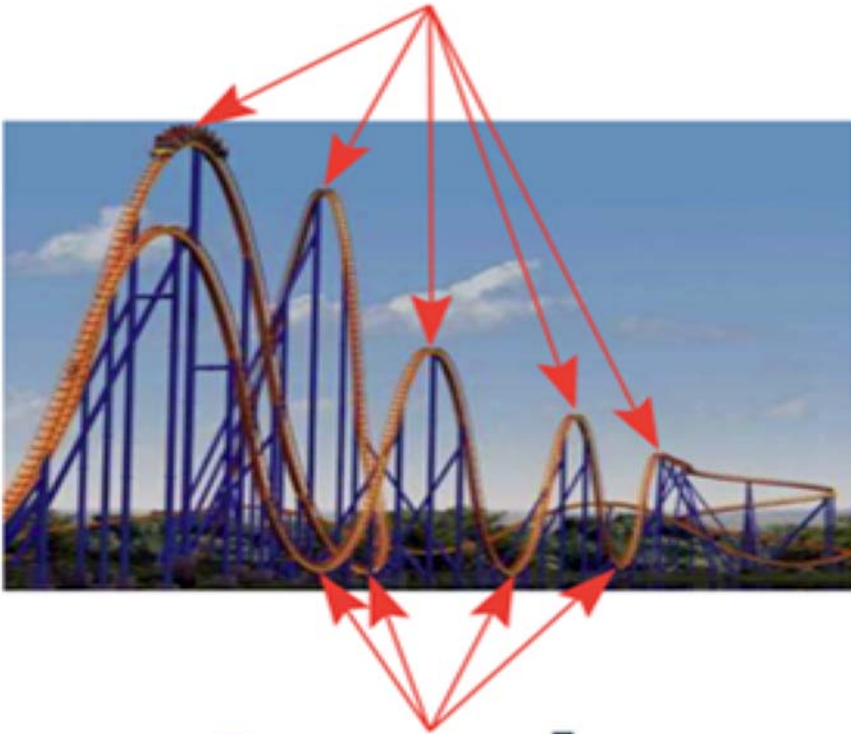


- * Low upfront costs
- * No strategic planning needed

Weaknesses of Managed Approach

- * Safety hazard for personnel doing the cleaning.
- * Unable to reach all areas
- * An uncomfortable job leads to shortcuts
- * 30 psi compressed air is not effective
- * Too expensive to clean daily
- * Recurring expense with no return on investment
- * Capital expense for equipment
- * Typically requires shutdown

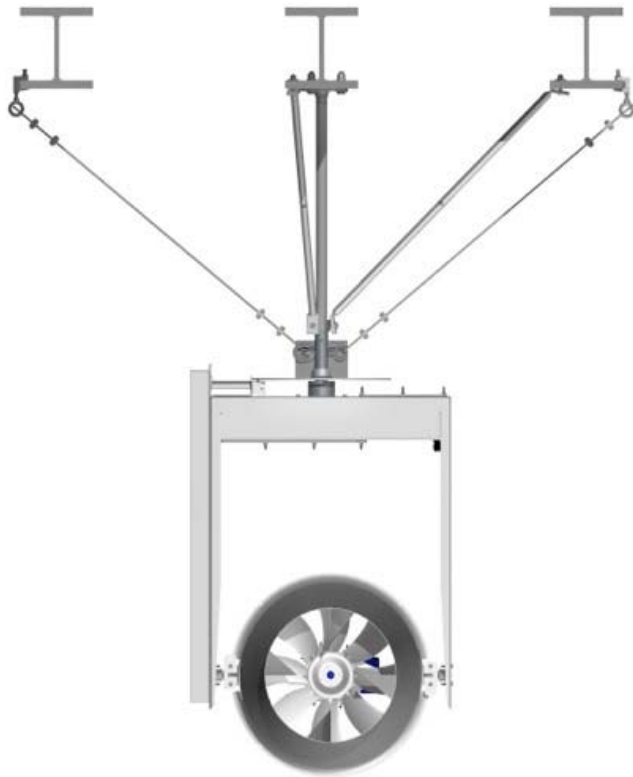
clean



not so clean

**Manual
Cleaning =
Cyclical
Cleaning**

The Engineered Solution



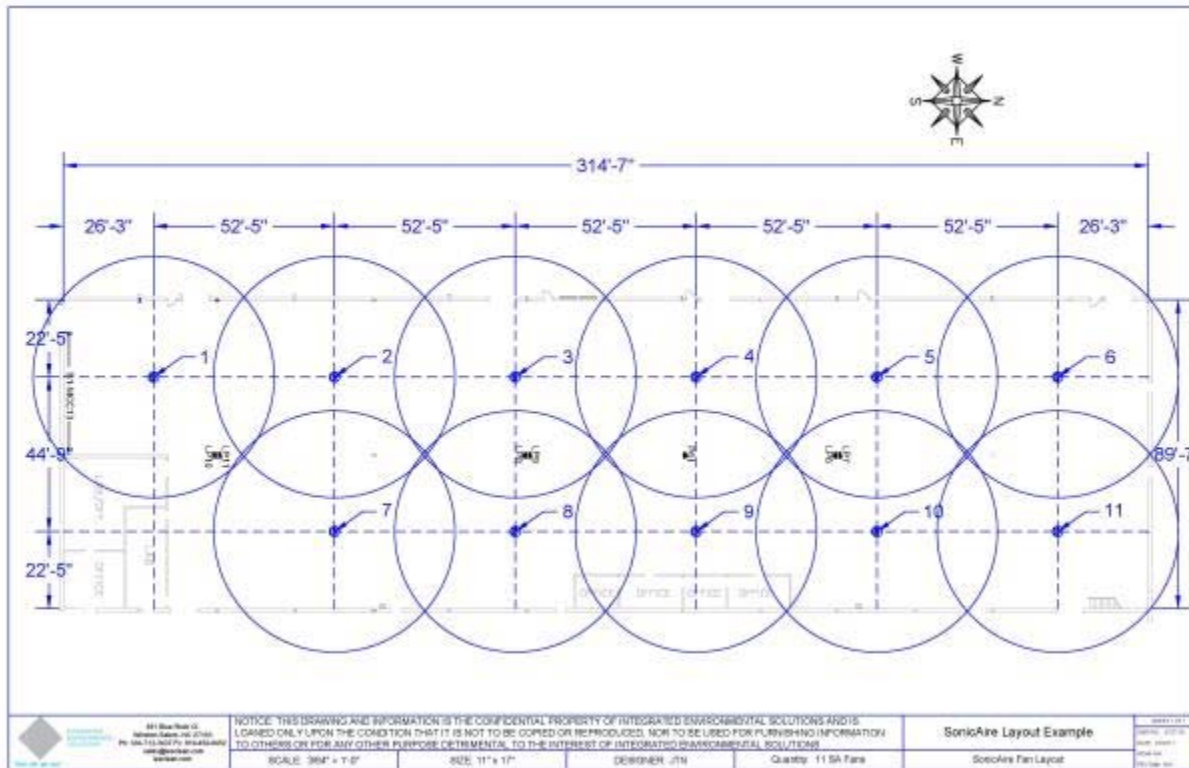
BarrierAire
TECHNOLOGY

BarrierAire = Continuous Clean

- No accumulation of dust
- No loss of production
- No labor costs
- No employees in hazardous situations
- BarrierAire Technology has an ROI
- Insurance rates may be lowered



Engineered System



Before and After



Dust control innovations.

Strengths of Engineered Approach

- Employees are not put at risk to clean
- Return on Investment
- Continuous compliance to the highest safety standards

SonicAire® Fans

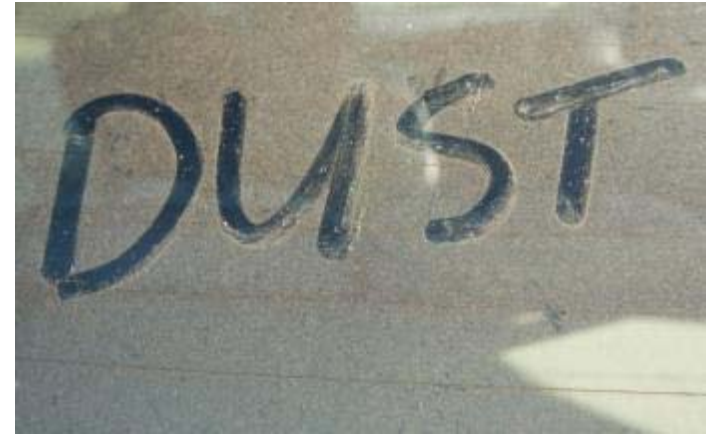
SonicAire fans can be used as an effective “barrier or strong air current” to prevent hazardous dust accumulations which in-turn eliminates or restricts Class II locations.

This also means that currently “classified” locations may now be considered “unclassified” locations per NFPA 70, 499, and ISA 12.10-1988.



What's the Most Effective Solution?

- Initial cost
- Operating cost
- On-going labor cost
- Employee morale
- Energy usage
- Disruption to normal production
- Ultimate in safety



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"Oh, that. OSHA stopped by the other day..."

Questions????

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