Addressing Combustible Dust: Proactive Efforts

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May, 2010 OSHA unplanned visit to the Foley Plant

Compliance Officer found dust in the Repulping area
How do you set housekeeping standards with workable direction in meeting OSHA’s requirements?
Issues

Depth of dust layer

Bulk density of dust

Surface area factors

Frequency and level of housekeeping efforts

Blow down practices

Review of existing vacuum systems
Resources

Legal: Larry Halprin, Keller and Heckman

Scientific: Vahid Ebadat & Steve Luzik, Chillworth Technology
In addition to the fire triangle, which has three elements:

1. A fuel
2. An oxidant
3. An ignition source
4. Suspension or mixing of the combustible dust
5. Confinement
Particle samples were tested for:

- Max. Explosion Pressure $P_m$ (bar)
- Max. Rate of Pressure Rise $dP/dt$ (bar/s)
- $K_{st}$ (bar.m/s)
- M.I.E. (mJ) (cloud)
- M.I.T. (°C) (cloud)
- M.I.T. (°C) (layer)
- M.E.C (g/m³)
Kst (bar.m/s)

Deflagration Index is calculated from the maximum rate of pressure rise and the size of the test sphere. The number is a scaling factor used to predict confined space explosion behavior in different size enclosures.
Minimum dust cloud ignition energy is a value that measures how easily a suspended dust cloud can be ignited by a low energy source, such as electrostatic sparks.
The temperature that a suspended dust cloud will ignite if exposed to a hot surface, typically 500 – 600 °C.
M.E.C (g/m$^3$)

Minimum exploisible concentration is the lowest concentration of dispersed dust capable of being ignited and supporting flame propagation.
Bulk Density:

Dust with bd of 1.5 lb/ft³ = almost 1.5 inches

Dust bd of 3.0 lb/ft³ = ¾ inch
Can we actually overheat a motor?
Current Housekeeping
Pulp dust layer greater than 1/32 inch

Wood dust layer of 1/8 inch

Housekeeping practices

Vacuum system changes

Utilize NFPA new process for calculating the volume of dust in an area.
Next Steps
Thank you.