TOOLBOX TALK · FIRE

Combustible Dust

About 8 minutes to deliver

Wood, grain, sugar, aluminium and plastic all explode as dust, and the first explosion is rarely the one that kills people.

Almost any solid that burns will explode when it is finely divided and suspended in air. Wood, flour, grain, sugar, powdered milk, coal, plastic, rubber, paper, and metals like aluminium and magnesium.

A solid block of it will not do much. The same material as dust, in a cloud, with an ignition source, releases all its energy at once.

THE FIVE THINGS IT NEEDS

Fuel, oxygen and an ignition source — the fire triangle — plus two more:

- Dispersion — the dust suspended in a cloud rather than lying still.
- Confinement — a room, a duct, a hopper, a collector, a bucket elevator.

Take away any one and there is no explosion. Housekeeping takes away dispersion and fuel at the same time, which is why it is the whole game.

THE SECOND EXPLOSION IS THE ONE THAT KILLS

This is the part everybody should know. A small event — inside a piece of equipment, in a duct, a flash in a corner — is often survivable on its own.

But the pressure wave from it shakes loose every bit of dust that has settled on the beams, the ledges, the pipe runs, the tops of the light fittings and the cable trays, and puts it all into the air at once. That cloud ignites off the first event, and that is the explosion that takes the building down and kills the people in it.

The rule of thumb used after several of these disasters: if a layer of dust across a surface is thick enough to obscure the colour underneath, it is enough to sustain an explosion. Roughly the thickness of a paperclip wire.

HOUSEKEEPING IS THE CONTROL

- Clean the horizontal surfaces you cannot see — beam tops, joists, duct runs, conduit, light fittings, rafters, the top of the electrical panel. Floor-level tidiness proves nothing.
- Never blow it down with compressed air. That takes a settled hazard and turns it into a suspended one, which is the exact condition an explosion needs.
- Vacuum with equipment rated for it, or wet methods where the material allows. A standard shop vac is an ignition source with a dust cloud inside it.
- Fix the leak, not just the pile. A recurring pile of dust is a piece of equipment that needs sealing.

IGNITION SOURCES

Hot work, grinding, smoking, static, overheated bearings, a tramp piece of metal through a mill, an electric motor without the right rating for the area, and a light fitting caked in dust running hot.

Hot work permits matter enormously here. Sparks travel, and they land where the dust is.

EQUIPMENT

Dust collectors, cyclones, hoppers and ducts are where these usually start — outside the building where practical, with explosion venting, isolation and suppression on them. If yours are inside and unvented, that is a conversation worth having above this crew's level.

ASK THE CREW

- What dust do we make here, and could it burn?
- When did anyone last look on top of the beams and the light fittings?
- Is anyone blowing dust down with an air line?

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29 CFR 1910.22 · 29 CFR 1910.176 · 29 CFR 1910.307

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ATTENDANCE RECORD

Combustible Dust

About 8 minutes to deliver · 29 CFR 1910.22 · 29 CFR 1910.176 · 29 CFR 1910.307

Date _____ **Job / site** _____

Delivered by _____ **Company** _____

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I delivered this talk and determined it was suitable for this crew and this work.

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