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Why going cheap on the dust collection & control system is short sighted...

We all know that our cars and trucks have air and oil filters to catch dust to avoid abrasive wear of the engine. We have seen news articles about how airborne dust is not good for jet engines - like when that Icelandic volcano erupted in 2010, or the Argentinean eruption in 2011.

So, why do so many industrial operations let their dust collection systems get plugged up and fail to perform? Assuming that they bother to install adequate dust controls in the first place?

One common complaint from the people who run foundries and factories is cost - buying a dust control system costs some serious coin, and too many operations try to go bottom dollar when they buy equipment. Another issue is maintaining and cleaning the equipment - this requires technicians with some training, whereas handing a laborer a shovel or a broom is a good way to keep him busy when things are a bit slow for making product.

This is especially problematic when the dust in question is combustible.

I've lost track of the mills and factories I've consulted for who have had "snowdrifts" of dust piled up because they didn't have the right dust collection and control system, and instead relying on housekeeping to deal with the mess. Fortunately, most of these operations were making steel or cement, and slag and rock dust don't burn or explode. They are abrasive however, and the dusts stick to exposed lubricated parts, like the cables of the hoist of an overhead crane, or the packing of a pillow-block bearing. It's difficult to quantify how much service life get eaten up by the grit grinding away on the machinery, but a knowledgeable maintenance superintendent can do predictive maintenance for his/her own shop, and develop the trend data.

Things get more complicated when the dust has hazardous qualities, such as toxicity or flammability.

OSHA has a distinct preference for engineering controls of such dusts - it makes sense to control and confine the potential hazard, making the work environment safer.

When we look at some key fatal accidents, we find that the dust control systems were no longer working as designed or installed. The Hayes Lemmerz explosion in Huntington, Indiana in 2003 was largely due to the inadequacy of their dust collection system http://www.csb.gov/investigations/detail.aspx?SID=33 which was leaking aluminum powder from its ductwork. The rash of explosions and fires at Hoeganaes in Gallatin, TN in 2011 were exacerbated by the prevalence of combustible iron powder due to the lack of adequate function of the ageing dust control

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equipment. The Imperial Sugar explosion in Port Wentworth, GA in 2008 was also largely due to inadequate dust controls. http://www.csb.gov/newsroom/detail.aspx?nid=284

When we look at the accident investigation photographs from these incidents, the prevalence of fugitive dust (dust which has escaped containment) is obvious - and frightening to a knowledgeable observer.

Housekeeping presents several problems as a means to control combustible dust. A major problem is that dust will deposit on any horizontal surface - like roof beams, conduits, and the top surfaces of machinery and internal enclosures (electrical & machinery rooms for example).

Then there is the issue of just how one goes about cleaning up the accumulated fugitive dusts. The CSB report on the explosion and fire at CTA Acoustics in Corbin, KY in February of 2003 http://www.csb.gov/investigations/detail.aspx?SID=35 shows that sweeping and blowing combustible dust can easily generate a combustible cloud, which can react with any ignition source.

Conventional industrial vacuum cleaners ("Shop Vacs") are not much better, since they lack specific grounding and venting to prevent internal explosion of the dust which they are sweeping up.

The recent sawmill explosions in British Columbia in January and February would appear to also be due to fugitive dust (final reports from the BC government are not yet available). The news reports indicate that the mills were operating with reduced staff, which would indicate that there were fewer employees available for maintenance and housekeeping. Factor in a drier source of timber - beetle killed trees - and the possibilities for dust problems become all too real.

The destructive fire at the Swany White flour mill in Minnesota in December of 2011 appears to be another example of fugitive dust catching fire - possibly due to a hot bearing on the ~100 year old milling and sifting equipment.

So, relying on housekeeping as a first line of defense against explosion and fire is a false economy - not only is there a greater risk to the workers, but the maintenance costs for machinery are higher, due to increased abrasion from dust getting into the moving parts of machinery.

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