



Analysis of dust fires and explosions in the food processing industry

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Nearly all solid granular foods and powdered ingredients, such as sugar, flour, grain, spices, starch, and powdered flavors, have the capacity to sustain a combustion. This may result often in dust fires, originating from dust layers and heaps, and sometimes also in violent explosions, when the dust is suspended and a cloud is formed. Many factors affect the explosion violence or the ignition sensitivity of a dust cloud: these can be related to physical properties of the solid material (particle size, moisture content, minimum ignition temperature, etc.) and to the geometry of the system involved in the explosion (closed vessels, long pipes, degree of turbulence, etc.). While the conditions to have an explosion occur rarely in processing buildings, hazardous dust clouds regularly form during bin filling, powder conveying, or dust collection.

The scope of this presentation is to review a selection of incidents occurred in the past involving solid food materials and analyze them against the current best industrial practices regarding explosion prevention and protection. Particular attention will be given to the analysis of potential ignition sources and their effectiveness in igniting the flammable dust atmosphere. A selection of "lessons learnt" will also be derived from the analysis of the incidents.

Lastly, the talk shall discuss the most recent trends of combustible dust fires and explosions among other industry sectors (pharmaceutical, wood processing, chemical, energy production), to gain insights about potential areas of improvement to advance in people and plant safety.