Mitigation of Dust Explosions in Bucket Elevators – A review

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ABSTRACT

Especially in the grain and feed industry bucket elevators are an important piece of process equipment conveying material in the upward direction to higher levels in a process plant. Bucket elevators may reach lengths of up to 50 m. Unfortunately these conveyors are involved in dust explosions on a regular basis. Main causes include rubbing of metal buckets against the legs of the elevator, hot bearings in the top of the elevator, foreign objects or smoldering material entering the elevator. Preventive measures such as temperature monitoring of bearings, proximity switches and gravity separators and magnets can reduce the likelihood of dust explosions considerably. Still mitigation measures might be necessary to reduce the consequences and thereby the risk of dust explosions to acceptable levels. In the present paper the mitigation of dust explosions by explosion venting and suppression is described in the light of recent experimental work carried out by the FSA in Germany and compared to earlier published results by among others the Health and Safety Laboratory. Guidance developed using these experimental results will be presented and discussed.