A Devastating Metal Dust Explosion in a Crushing Plant

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Abstract

A dust explosion in a facility producing ferrosilicon magnesium in Norway resulted in serious damage to the facility and the building containing the facility. One employee was killed.

The paper describes in detail how the accident developed, its cause and the consequences.

The facility consisted of two crushers, a number of classifiers and a number of silos/hoppers. Dust was removed at several locations in the plant using an aspiration system including a cyclone and filter. Sparks generated in one of the crushers resulted in a fire in the metal dust on one of the transport belts. The installation was stopped but no attempts were made to fight the metal fire. The belt caught fire and after a while a part of the belt fell down whirling up metal dust lying on the floor of the production hall. The dust cloud immediately ignited (a “flash” occurred) igniting dust present in one of the lines of the aspiration system. The dust flame accelerated in the aspiration line causing a devastating explosion in the cyclone and filter.

The paper addresses not only lacking technical preventive and protective measures but also necessary safety awareness and training of personnel.