

FIG. 35-15 — Demonstration of explosive properties of flour dust Sifting flour through a cloth into the flame produces fiery bursts that illustrate what happens in grain elevators and other dust-laden atmospheres when dust clouds are ignited

sions (*a*) prevent the formation of explosive mixtures of dust and air, and (*b*) prevent the ignition of such mixtures if their formation cannot be prevented

Extraordinary precautions, if such are necessary, should be taken to prevent accumulations of dust which may build up to explosive proportions Extensive use of local exhaust and frequent cleaning will do much to minimize the hazard Where possible, dusty operations should be segregated, and dust-producing equipment should be totally enclosed and exhausted to prevent leakage of dust into the general work area

Buildings with high explosion hazards, such as grain elevators or plastics plants, are generally provided with extensive dust-collecting equipment and so constructed that explosive pressures will push out hinged windows or blow out wall sections or panels designed and built to fail in a predetermined area, rather than cause structural collapse (See NFPA Standard No 68, *Explosion Venting*) Floor openings should be kept to a minimum and openings for pipes and duct work should be sealed

Portable fire extinguishing equipment should be readily available Fog nozzles or finely divided streams of water are more effective than are solid streams of water, which stir up dust

Ignition of an explosive mixture of dust and air may be prevented by control of open flames, friction sparks, static electricity, welding, and excessive heat, or by increased humidity, or by using inert gas Every precaution should be taken to prevent overheated bearings, smoking, friction sparks, and sparks from hand tools, from grinding or welding operations, and from static electricity Only nonferrous tools should be used in dust exposures, and employees should wear shoes with nonferrous nails

Nonferrous material should also be used for truck wheels, and bucket conveyors should be prevented from striking sparks Pneumatic or magnetic separators can be used to remove stones, nails, and other spark-producing foreign objects from the material being processed

Only approved dust-tight wiring, fixtures, and motors should be used, and employees should be instructed to use only extension cords, lamps, and portable electric tools designed for protection against this hazard (See NFPA "National Fire Codes," Volume 3)

Gases and vapors Gases and vapors that produce flammable mixtures with air or oxygen are common in industry Some such gases are acetylene, propane, hydrogen, carbon monoxide, methane, natural gas, and manufactured gas

Highly volatile liquids which emit flammable vapors include gasoline, benzene, naphtha, and methyl alcohol Kerosene, turpentine, Stoddard solvent, and other liquids with flash points above 100 F must generally be heated above normal room temperatures before they give off sufficient vapors to form ignitible concentrations

When flammable liquids, including those with flash points above 100 F, must be handled and used, only minimum amounts, in safety containers, should be allowed in work areas