

43—Fire Protection

should be stationed to prevent sparks or molten slag from starting fires or to extinguish fires. The watchers should remain at the work location for at least one hour after the welding or cutting is completed because some fires escape detection at the time of their inception.

Shields should be installed around spot welders to prevent sparks from reaching combustible materials nearby or from injuring employees.

Spontaneous ignition

Spontaneous ignition results from a chemical reaction in which there is a slow generation of heat from oxidation of organic compounds that, under certain conditions, is accelerated until the ignition temperature of the fuel is reached. This condition is reached only where there is sufficient air for oxidation but not enough ventilation to carry away the heat as fast as it is generated.

It is a condition usually found only in quantities of bulk material packed loosely enough for a large amount of surface to be exposed to oxidation, yet without adequate air circulation to dissipate heat. Exposure to high temperatures increases the tendency toward spontaneous ignition.

The presence of moisture also can advance spontaneous heating unless the material is wet beyond a certain point. Materials like unslaked lime promote spontaneous ignition, particularly when wet. Such chemicals should be stored in a cool, dry place, away from combustible material.

It is generally agreed that at ordinary temperatures some combustible substances oxidize slowly and under certain conditions can reach their ignition point. These include vegetable and animal oil and fats, coal, charcoal, and some finely divided metals. Rags or waste saturated with linseed oil or paint often cause fires too.

The best preventives against spontaneous ignition are either total exclusion of air or good ventilation. With small quantities of material, the former method is practicable. With large quantities of material, such as storage piles of bituminous coal, both methods have been used with success.

Temperatures of 140 F are considered dangerous in coal piles. If temperatures rapidly



FIG. 43-8 —A sheet metal waste can constructed to prevent opening the cover more than 60 degrees from the horizontal, thus ensuring automatic closing.

approach or exceed that figure, it is generally advisable to move the pile or rearrange it to allow better circulation of air.

Certain agricultural products are susceptible to spontaneous ignition. Sawdust, hay, grain, and other plant products such as jute, hemp, and sisal fibers may ignite spontaneously, especially if exposed to external heat or to alternate wetting and drying. Here again, the best preventive is circulation of air, removal of external sources of heat, and storage of material in smaller quantities.

Fires in iron, nickel, aluminum, magnesium, and other finely divided metals are sometimes attributed to spontaneous ignition believed to result from the oxidation of cutting or lubricating oils or possibly from chemical impurities.