Manure Pits Stats and Facts



FACTS

1. Inside the pit, the manure undergoes anaerobic digestive fermentation to form fertilizer. The digestive process can generate four potentially dangerous gases:

- Methane
- Hydrogen sulfide
- Carbon dioxide
- Ammonia

2. The accumulation of gases within the confined space of the manure pit can produce an oxygen-deficient, toxic, and/or explosive environment.

3. Manure pits are designed as confined spaces with limited means of entry and unfavorable ventilation. The gases generated by the bacterial decay of the manure may accumulate sufficiently to create deadly oxygen-deficient (less that 19.5% oxygen), toxic, and/or explosive atmospheres.

4. Methane and hydrogen sulfide gases are generated naturally in all anaerobic manure pits.

5. Hydrogen sulfide (H_2S) has a rotten egg odor at low concentrations, but as concentration increases, people can no longer smell this compound (olfactory fatigue). At and above concentrations of 100 ppm, severe eye and lung irritation begins, and pulmonary edema (a potentially fatal lung condition) may occur. Most importantly, at high concentrations (800 ppm and above), the respiratory system is paralyzed, and the exposed person loses consciousness, with typically fatal outcomes.

STATS

- Research suggests that 20% to 25% of manure gas fatalities involve young people, with incidents often claiming more than one victim. Contributing factors include young people□s lack of awareness of basic storage and handling hazards, lack of appropriate safety equipment, failure to comply with safe confined-space practices, and lack of supervision or training.
- Asphyxiation, primarily from hydrogen sulfide intoxication, is a leading cause of severe injury and death associated with manure handling. In another study, Purdue researchers looked at 91 deaths □ seven from Pennsylvania □ and 21 severe injuries related to manure-generated gas. They reported that 34% of the gas exposure deaths occurred during repair or maintenance, and 22% of deaths were

among those attempting rescue.

- Riedel and Field (2013) recently reported on 132 manure storage injury incidents from across the U.S. Of the 132 cases, 110 (83%) were fatal, and 20% involved children under the age of 16, with nearly all of them fatal (96%). The most frequent (34%) activity was conducting repairs or maintenance activities, with the second most frequent activity (22%) a rescue attempt of another person entrapped or overcome in a manure storage structure or facility.
- Occupational mortality rate was found to be 7.4 per 10,000 per year for occupational deaths related to agriculture compared to 3.1 per 10,000 per year for deaths not related to agriculture. In most of the cases associated with sewage or livestock waste handling, victims died of asphyxiation. While manure pit injury is rare, it has an extremely high fatality rate.