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### **Confined Space Manure Storage and Facilities Safety Assessment**

Murphy, D. J., & Manbeck, H. B. (2014). Confined space manure storage and facilities safety assessment. *Journal of agricultural safety and health*, 20(3), 199-210.

A mail survey of 1,200 farms across 16 states was conducted to identify the number, type, and size of manure storages per farm, as well as safety-related behaviors or actions related to entry into confined-space manure storage and handling facilities. Respondents provided data on 297 storage units and facilities, with approximately 75% reporting up to three storages per farm operation. Dimensions were provided for 254 manure pits: nearly 66% were less than or equal to 100 feet long, 75% were less than or equal to 40 feet wide, and 75% were less than or equal to 10 feet deep. Almost 14% of the reported storages were over 300 feet long, seven were wider than 100 feet, and 17 were more than 20 feet deep. Survey results suggest that most farm operations with confined space manure storages do not follow best safety practices regarding their manure storages, including using gas detection equipment before entering a manure pit, using rescue lines when entering storages, or developing a written confined-space safety policy or plan. Survey results also suggest that few farmers post warning signs around their storages, post recommended ventilation times before entry, or conduct training for workers who enter confined-space manure storages. This article provides a benchmark against which the effectiveness of educational programs and design tools for confined-space manure pit ventilation systems and other confined-space manure pit safety interventions can be measured.

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### **Utah Farm Owner/Operators' Safety Practices and Risk Awareness Regarding Confined Space Work in Agriculture**

Pate, M. L., & Merryweather, A. S. (2012). Utah farm owner/operators' safety practices and risk awareness regarding confined space work in agriculture. *Journal of agricultural safety and health*, 18(4), 273-284.

The purpose of this study was to describe current safety practices and risk awareness associated with confined spaces in agriculture among Utah farm owner/operators. There were 399 farm owner/operators in the sample. The final response rate was 82.2%. The typical farm owner/operator in this study was male, between the ages of 50 and 59, with some education beyond high school. Grain and dairy production comprised 48.7% of the operations responding to the survey. A majority (50.2%) of respondents reported having entered a confined space without an observer waiting from the outside. All but 9.5% of the respondents indicated that they had no written emergency response plan in the event of a confined space emergency involving an entrant. Only 49.1% of farm owner/operators perceived entering a grain bin while unloading as a high risk for fatal injury. More research is needed to determine the farmers' knowledge of the variety of hazards associated with confined space work. Few farm owner/operators reported using accessible safety equipment. A limited number of respondents indicated having access to gas monitors, lifeline and harness systems, or ventilation blowers with flexible ducting. This may be associated with the costs of the equipment, or lack of awareness of the need for specific safety equipment.

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### **Confined Space Rescue: A Proposed Procedure to Reduce the Risks**

Selman, J., Spickett, J., Jansz, J., & Mullins, B. (2019). Confined space rescue: a proposed procedure to reduce the risks. *Safety science*, 113, 78-90.

Each year, workers are killed in incidents involving confined spaces. To minimise and control the risks so far as reasonably practicable, confined space work should be thoroughly considered and carefully planned before any entry. Unfortunately, when would-be rescuers attempt the rescue of fellow workers, multiple fatalities can result. Confined space rescue should always be a deliberate undertaking, planned prior to the confined space entry taking place, and conducted by trained personnel. This paper proposes a five step procedure to safely undertake confined space entry rescue, mindful of the hierarchy for protection (rescuers, bystanders, and casualties); and of the hierarchy of the level of confined space rescue (self-rescue, non-entry rescue, and entry rescue). The proposed confined space rescue procedure is a simplified and broad-based process for the preparation and conduct of a confined space rescue by on-site or in-house rescue teams, and is an adaptation of the procedures used by professional emergency services. The five step procedure is described by the acronym REALE. Step 1 is [Reconnaissance](#) of the rescue task. Step 2 is Elimination or reduction of hazards. Step 3 is Accessing the casualty, in which a minimal number of rescuers enter the confined space and make contact with the casualty. Step 4 is the provision of Life-saving first aid to the casualty. Step 5 is the Extrication of the casualty as required. The proposed procedure is suitable for adoption by rescue teams regardless of country or jurisdiction as it meets the requirements for all [regulations and standards](#).

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