

Constructed Manure Storage Facilities

Constructed manure storage facilities include stackhouses for poultry litter, concrete or steel manure tanks, and other possibilities. These types of storage facilities are more likely to be “pre-engineered” packages, and thus may be less subject to specific design and/or construction procedures by the livestock producer. If a constructed manure storage facility is contemplated, the producer should identify potential suppliers who have a proven product and have demonstrated expertise in the necessary sizing and construction procedures. Constructed manure storage facilities may be an alternative where severe geological limitations (gravel, permeable soils, collapse potential) would preclude an earthen impoundment. Constructed facilities are usually not intended to store highly dilute manure or manure containing runoff from lots due to their higher cost per unit of storage compared to earthen impoundments.

Concrete structures

Manure storage facilities are often constructed using concrete as a material due to its strength and durability. A professional engineer or other qualified consultant should be engaged to assist in the design of concrete manure storage structures. Structural considerations and specific construction techniques and procedures require extensive technical knowledge and expertise. The MidWest Plan Service publication *MWPS-36, Concrete Manure Storages Handbook* is an excellent reference on concrete manure storage structures.

Below-ground concrete structures must be designed to withstand the inward pressure of saturated soil when that pressure is unbalanced, i.e., the tank is empty and there is no outward pressure by manure. Additionally, surcharge loading due to heavy equipment operating in close proximity to the tank wall must be considered. Below-ground tanks can experience unbalanced uplift forces when the soil outside the tank is saturated and the tank is empty. Provide adequate foundation and perimeter drainage around the tank to minimize this possibility. In selecting a tank configuration, consider agitation and pumpout requirements, and the possible need for partitions or supporting walls within the tank itself. Vigorous agitation of slurry manure tanks is usually necessary for complete cleanout. Such agitation may not be achievable at distances greater than 40 ft to 60 ft from the agitating device. Provide adequate safety barriers such as grills over tank openings to prevent accidental entry of humans or animals into the tank.

Aboveground concrete tanks may be of poured, stave, or precast panel construction. A circular configuration is the most efficient structural design, and circular tanks may be constructed up to 120 ft in diameter and 20 ft deep. Rectangular tanks are generally limited to 8 ft to 12 ft depths and unbraced wall lengths of 40 ft to 50 ft due to structural requirements.

Steel structures

Pre-engineered manure tanks made of plastic or glass-coated steel are an alternative to concrete tanks. Such tanks are usually circular and are available only in certain sizes. The size should be selected to provide the storage period desired according to the methods outlined earlier. Consult with a qualified manufacturer or design expert when selecting and constructing a steel tank.

Constructed manure storage facilities are usually used to store slurry manure, which contains minimal lot runoff or dilution water. Constructed facilities may be required if soil characteristics are not suitable for an earthen impoundment.

Concrete manure tanks may be an ideal alternative when earthen storages are not suitable. The tanks must be designed to withstand the pressure from the manure inside and from the soil outside.

Accessories to facilitate loading, agitating, and unloading must always be considered in implementing a constructed manure storage facility.

Accessories

Constructed tanks may require certain accessories for loading, agitation, and unloading. Some tanks may be loaded (top or bottom) via a pump in an adjacent reception pit. Dedicated ports, or openings, may be required to properly agitate a constructed manure tank. Tanks in buildings (slatted underfloor pit) will require special consideration for agitation and emptying. Open tanks exposed to rainfall will be required to store the extra volume. A roof or covered tank will divert this extra “clean” water and reduce the amount to be handled in the manure management system.