Manure Liquid - Solids Separation

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Lagoon management is eased by separating solids from raw manure or flushed waste prior to lagoon input. Removing fiber from cattle wastes and grit from poultry manure significantly reduces the lagoon solids buildup rate and associated pumping problems. Removal of oxygen-demanding solids in swine and poultry manure reduces the lagoon organic loading and lessens its odor potential. Beneficial uses of the recovered solids include bedding materials, animal feed ration supplements, composts, and soil amendments.

MECHANICAL

To recover a drier by-product relative to other methods, vibrating-screen, sloping stationary screen or pressure-roller mechanical separators are probably most advantageous. Waste is collected in a sump sized to store 3 - 4 days accumulation of manure plus dilution and flush water. A submersible or stationary bottom-impeller, agitator-lift pump mixes the waste into a slurry and pumps it across the separator where the liquid drains into the lagoon. Solids are dry enough to be handled by conventional solid materials handling equipment. Up to 30% of the total solids and 25% of the oxygen-demanding materials are removed.

GRAVITY

A gravity settling basin may be less costly while removing 50% or more of the solids from liquid manure. Solids can be settled and filtered by a shallow basin (2 - 3 feet deep) with concrete floor
and walls and a porous dam or perforated pipe outlet. It should allow access by a front-end loader to remove solids every 1 - 2 months.

An alternative is an earthen settling basin for 6 to 12 months storage of solids. The basin top width should be no more than 100 feet with a length-to-width ratio near 3:1 and a liquid depth of 8 - 10 feet. The basin contents should be thoroughly agitated and removed for land spreading either by liquid manure spreader or slurry irrigation.

A third alternative consists of a large rectangular metallic or concrete settling tank with a 3:1 length-to-width ratio and an 8-feet liquid depth. Tank volume depends on a peak-flow wastewater detention time of 10 to 30 minutes. Most readily settleable solids in livestock manure settle in about 10 minutes although some additional settling occurs for hours. Tank inlets and outlets are baffled and solids are removed by automated skimmers and scrapers. Unless substantial solids storage is added to the settling tank volume, cleanouts will need to occur frequently.