

Dairy Manure Handling

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especially storages holding large amounts of manure, are a threat to the environment.

Any good manure handling system will include backup plans to allow continuous operation even if key components malfunction.

Advanced thought should be given to how a large manure spill, resulting from a damaged storage or broken pipe, can be contained before large quantities of manure reach nearby streams or lakes.

Hazards

Manure systems present hazards from asphyxiation, poisoning, drowning, and machinery entanglement and entrapment. Pumps pits and tanks can easily contain poisonous gases that will not be apparent until someone enters the tank and is overcome.

Multiple deaths have occurred as a result of failure to follow appropriate procedures for working in these confined spaces. Do not enter manure sumps, pits or storage tanks without appropriate safety apparatus and procedures. No tool, pump part, or farm chore is equivalent in value to the cost of a human life!

Another common hazard is failure to provide adequate guarding at manure tank openings and push off ramps to prevent entry by people, tractor scrapers, or cows. All open storages or openings into storages must have adequate fencing, guards, or covers to prevent visitors, including small children, from gaining entry.

Everyone has an obligation to design, supply, buy, operate, and maintain manure storage and handling systems that are safe for workers and visitors.

Handling Systems

A complete system allows for collection and removal of manure from the animal housing areas, treatment if necessary, transport to storage system, short and long term holding or storage, transport to cropland, and land application.

Collection systems include gutter cleaners and gravity flow channels in tie stall dairy barns and tractor scrapers, automatic alley scrapers, flushing, and slotted floors in freestall dairy barns.

Outside yards, lots, and feeding areas can be cleaned with scrapers or in some instances flushing.

Bedded pack and pen areas should be designed to allow cleaning with tractor loaders. New and major renovated pack areas should have sufficient access and clearance to allow use of large front end loaders for pack removal.

Scrapers with rubber edges or made from sections of large rubber tires provide less wear and polishing of concrete and tend to squeegee the floor.

Metal blades or buckets with down pressure are more effective under freezing conditions.

Manure may be pushed off an elevated lip directly into a spreader or pushed into a storage or collection gutter. In some cases it is pushed to an area with a buck wall for loading with a bucket loader.

Automatic freestall alley scrapers are often cost and labor savers on large farms and frequent operation provides cleaner alleys and cows. The cost and time required for maintenance or alley scrapers is often less than the total cost (labor, machinery, maintenance, injured animals) of daily tractor scraping.

Unattended operation of alley scrapers where very small or new born calves could be dragged away by the slow moving blade is not recommended.

Alley scrapers must discharge through a hole, over a collection channel, or off the edge of a storage.

The drop off point for the manure must be located and protected to assure that people, animals or equipment will not inadvertently fall in.

Flush cleaning is a low labor method that allows for frequent cleaning and results in drier alleys and cleaner cows.

Important components of flush systems are adequate water supply, water disposal system, elevations, slopes, pumps and pipes.

Systems can successfully operate much of the year, even in cold climates, if adequate facilities are available to take care of storage of extra water.

The most common problems with flushing systems are the quantity of water required and separating solids for reusing water.

Farmers are often overwhelmed by the amount of water that must be handled and the need for more dilution water in recirculating systems than expected.

Criteria for satisfactory flushing include water volume per flush, flow rate, duration of flush, velocity of water, and depth of water.

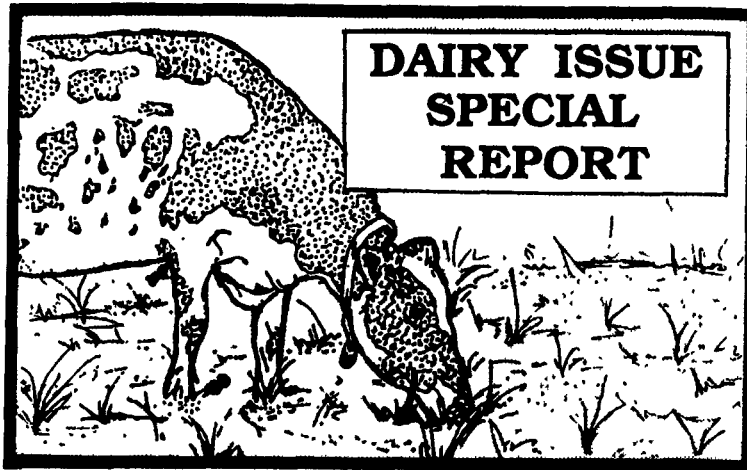
In general, a 3 inch depth of water and 5-foot-per-second velocity are recommended. A 3-percent alley slope is often consid-

ered ideal. Steeper slopes will require more water and a higher flow rate, shallower slopes will require a high rate of water to maintain velocity.

Water can be supplied from tip tanks, reservoirs with large gates that open or delivered through large pipes from high volume pumps or elevated holding tanks or ponds.

Slotted floors provide a method for immediate removal of manure from the animal area. Once beneath the floor, manure may be stored in an underfloor tank or removed by an automatic scraper, flushing, or a gravity flow channel. Manure stored under slats can result in gas, odor and moisture problems in enclosed barns and should be avoided. Keep animals and people out of enclosed barns and provide maximum ventilation during agitation and clean out, if a manure tank is located under the slats.

Floors may be configured with long parallel slats and slots, or



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oblong holes in a so called waffle pattern.

Field observations indicate that animals seem to walk more surely on waffle slats but no research is available concerning either configuration.

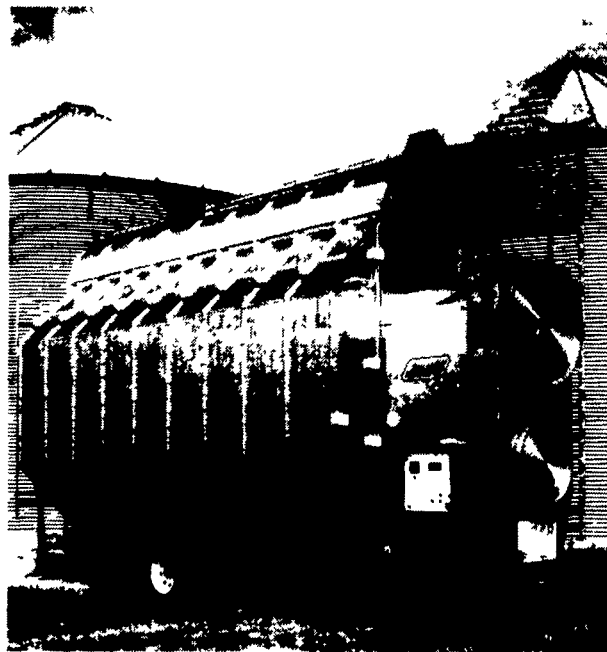
Slatted floors allow urine to drain quickly away and manure is pushed through the slots by animal traffic. The result is a drier environment for the cows' hoofs.

If used in extremely cold situations manure will eventually freeze and not go through the slots. Provide access for a tractor scraper to remove manure during cold weather.

Removal systems move manure from the barn to the field for immediate application or to storage.

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The "Smart" Dryer

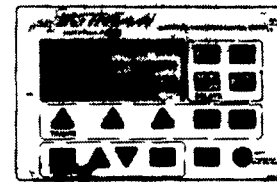


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