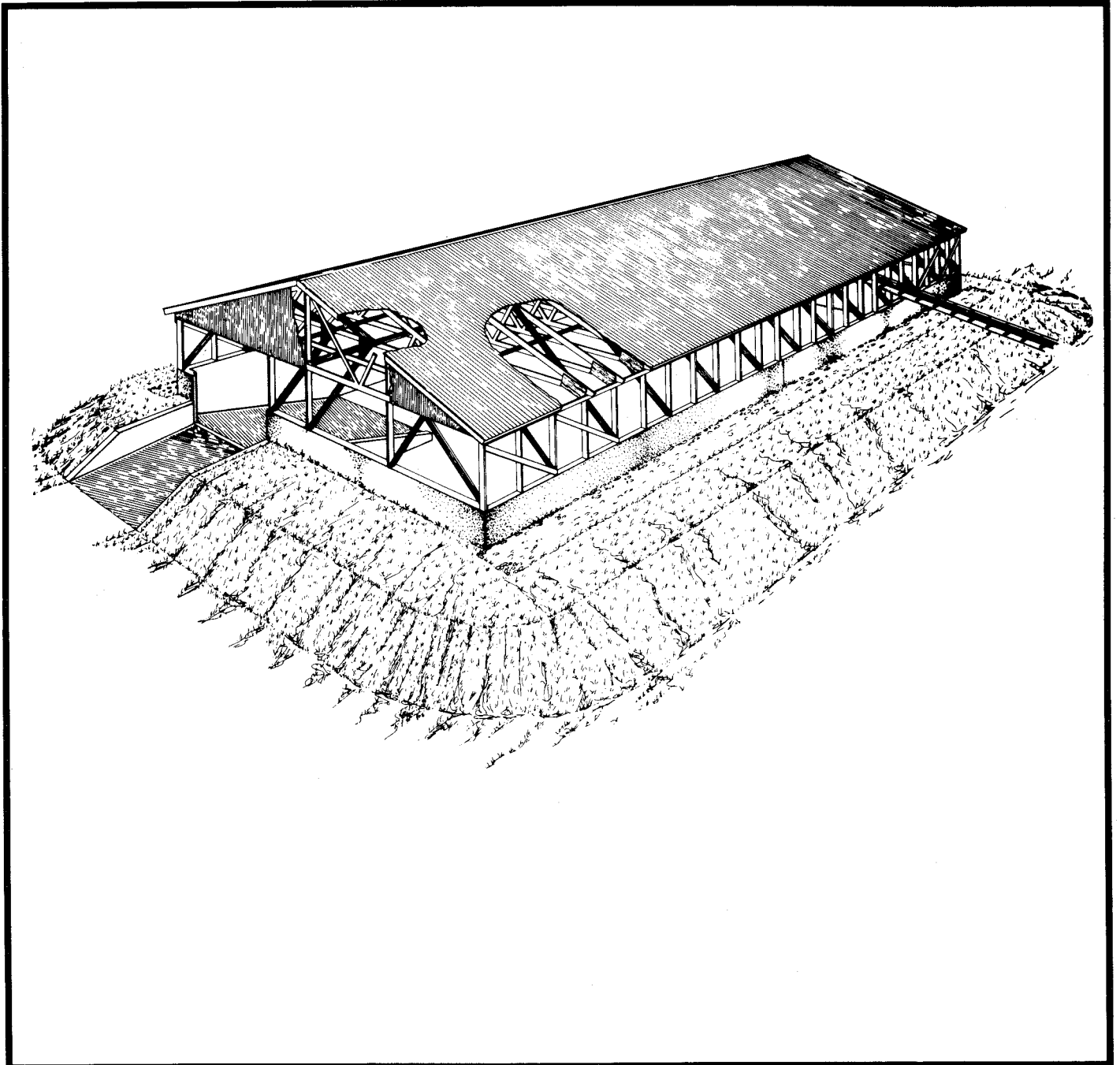


RECTANGULAR ROOFED STORAGE FOR SEMI-SOLID MANURE



The Canada Plan Service prepares detailed plans showing how to construct modern farm buildings, livestock housing systems, storages and equipment for Canadian Agriculture.

This leaflet gives management information and describes one of these detailed plans. To obtain a copy of the Canada Plan Service detailed plan, contact your local provincial agricultural engineer or extension advisor.

RECTANGULAR ROOFED STORAGE FOR SEMI-SOLID MANURE

PLAN M-2705 NEW 7:78

This plan is for a rectangular manure storage with reinforced concrete walls 2 400 mm high and a roof to keep out rain. This type is best suited for semi-solid manure with little bedding added, such as manure from dairy free-stall barns. The walls and the sloping tractor entrance ramp hold liquids as well as solids, to control pollution of nearby streams and other water supplies. The tractor entrance ramp is for loading, hauling, and spreading operations with a tractor front-end scoop loader and manure spreaders. Stop-logs may be placed across the entrance ramp when required to contain manure when the storage is full to capacity.

Construction

Start construction by excavating to floor level about 750 mm below the original ground. This helps to protect the footing from heaving due to frost since the excavated soil can be later packed outside the wall to about 1 500 mm above the footings. This also helps to support the liquid pressure inside when the storage is full. Pour the concrete floor and footings on firm undisturbed subsoil and place a keyway and steel reinforcing in the footings to support walls. Walls are 200 mm reinforced concrete to 2 400 mm height. Short wood studs support the 12 000 mm clear span roof trusses 1 500 mm to 2 700 mm above the concrete walls. This gives 3 900 mm to 5 100 mm of clear unobstructed headroom for easy manure lowing. Note that the conventional wood sill is not used at the base of the studs; this member would be exposed to manure and weather, and could rot prematurely. Bottom ends of the studs and wind braces should be cut to fit, then soaked overnight in creosote wood preservative before bolting to the concrete walls.

Filling and emptying

Semi-solid manure with very little bedding added will spread and flow out from the point where it is dumped into storage.

This storage can be filled mechanically from nearby barns by;

1. gutter cleaner extension (at low slope), or
2. tractor and scoop loader, dumping over the wall or
3. plunger manure pump and underground pipe

Manure should be dumped as close as possible to the center of the storage to minimize the possibility of overflow. In very cold climates the plunger manure pump is more suitable than the other two methods, since the pipe can be buried below frost, and the storage fills from beneath instead of the top.

To empty, use a vacuum tanker (or small irrigation pump and sprinkler system) to draw off and spread the separated liquids. Be careful to spread the liquid manure only when winds are blowing away from neighboring properties and nearby public

roads. Then load and haul the remaining semi-solid manure with tractor scoop loader and manure spreader, by way of the entrance ramp at one corner of the storage. Box-type manure spreaders require special hydraulic endgate attachments to carry this type of manure without spilling.

Manure storage capacity

This storage will hold about 28 cubic metres (m³) of liquid and semi-liquid manure per metre of length. For example, 6 months manure storage for 60 dairy cows would be:

$$\frac{60 \text{ cows} \times 180 \text{ days} \times 0.068 \text{ m}^3/\text{cow-day}}{28 \text{ m}^3/\text{m length}} = \frac{26.2 \text{ m long}}{\text{(build 26.4 m)}}$$

Before building a roofed manure storage, compare the cost of the roofed rectangular tank against the extra cost of spreading rain water collected in a cheaper unroofed storage such as Plan M-2701.

Odors, local

Open manure storages can be sources of bad odors and flies, making life unpleasant around the farmstead, and especially when manure is disturbed at spreading time. Locate the manure storage as far as possible and downwind from the residence and from neighbors. Spread manure only when the wind is blowing away from the closest neighbors, and cover quickly if possible by plowing or cultivating.

Obtain approval from local authorities while planning improvements to manure systems and livestock housing.