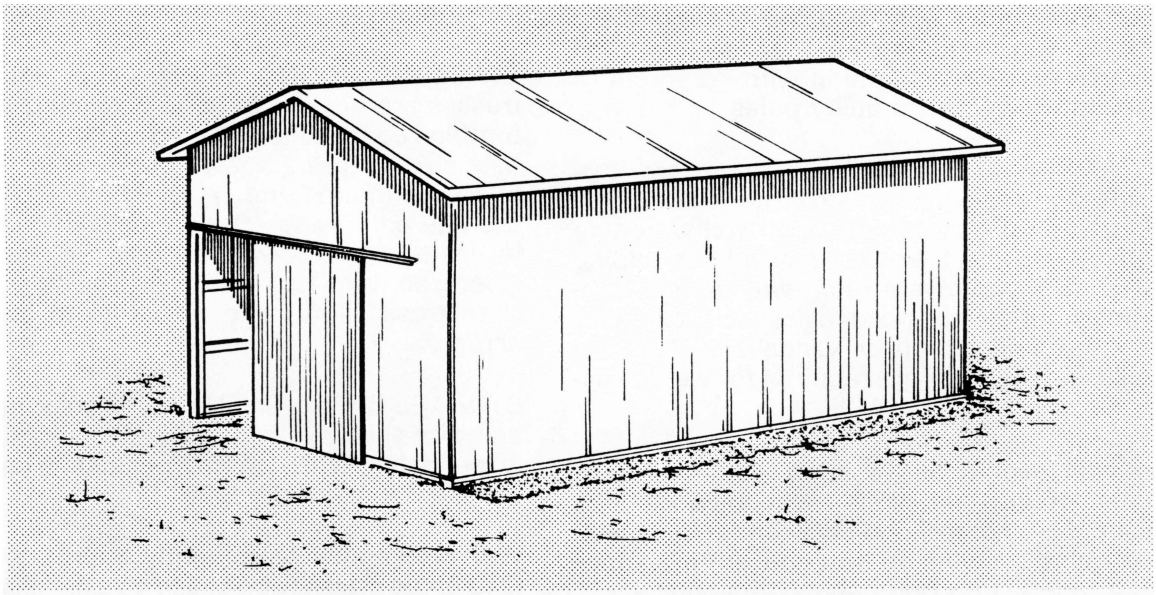
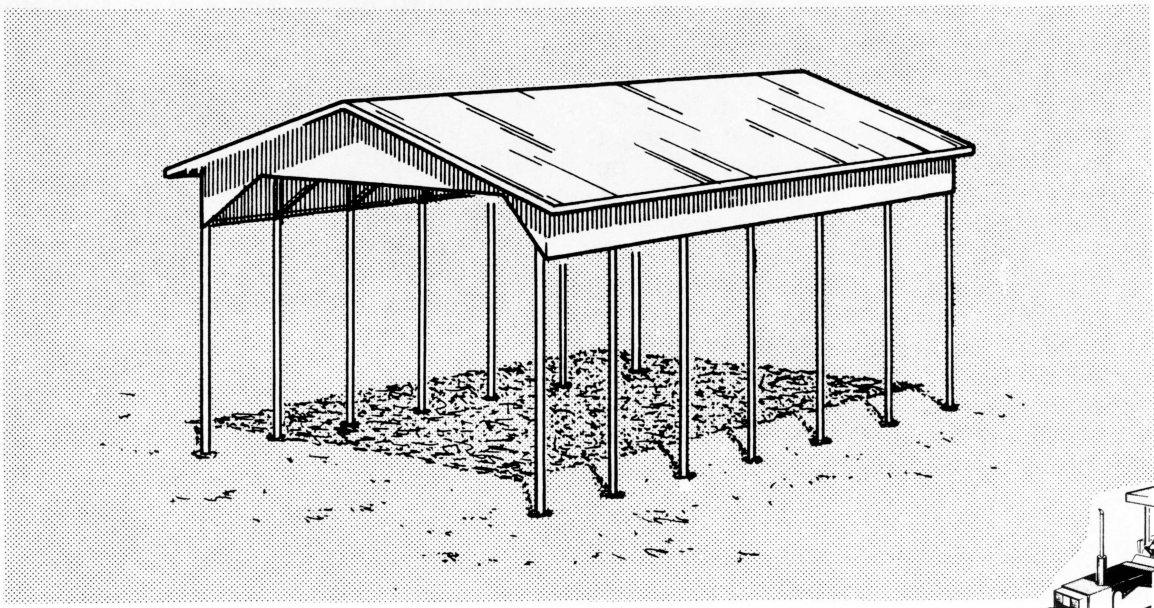
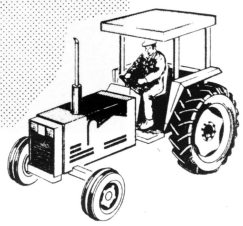
BRITISH COLUMBIA Ministry of Agriculture, Food and Fisheries
Agricultural Building Systems Handbook
PLAN
372-24

HAY STORAGE FOR ROUND OR RECTANGULAR BALES







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HAY STORAGE FOR ROUND OR RECTANGULAR BALES

CPS
PLAN M-7601 REVISED 86:04

This plan gives construction details for a pole-frame hay storage with a clear-span truss roof. It was designed primarily for round bales although it can serve equally well for handling and storing smaller rectangular bales. Building length and width can be adjusted to suit individual needs and local roof snow loads. The plan shows a span of 12 m (40 ft), with the length any multiple of 2.4 m (8 ft), the spacing of the sidewall poles. The height is 5.7 m (19 ft) from ground to trusses, convenient for farming with 7.2 m (24 ft) CCA pressure-treated round utility poles.

CLOSED VERSUS OPEN WALLS There are two options; one with walls closed with girts, cladding and sliding doors and the other with open walls. Adding endwall poles, closing the walls and adding sliding doors, extra trim, hardware, etc., will double construction costs but may be needed in special cases for added security against fire or vandalism. With the closed walls, bigger poles are required for wind resistance.

The open-wall design has a short perimeter skirt extending 1.2 m (4 ft) below the eaves to conceal the knee-bracing, help control end-sway and reduce wetting of the bales by blowing rain and drifting snow. This design requires no poles across the ends.

CONSTRUCTION The structure is framed with CCA pressure-treated round poles set into post holes and anchored with concrete. Cedar poles, butt-treated on the farm, can also be used but do not last as long. Do not use wood treated with creosote or pentachlorophenol preservatives in contact with the stored hay (see also 378-60 (CPS M-9401), Wood Preservatives).

To drill the postholes, obtain a public utility auger rig large enough for the footing diameter specified in the plan. Farm posthole augers are too small. If the soil contains gravel or similar loose material that falls back into the holes, it may be necessary to dig oversized holes with a backhoe, then form and pour square concrete footing pads instead of the round footings shown in the plan.

To support the clear-span truss roof at the top of the poles, notch for a laminated plank plate beam partway into the poles. Notching is hard to do after the poles are erected; a better way is to accurately measure the poles from the bottom, cut the notches and trim off the top of the poles with a chainsaw before erecting them. The hole for bolting the trusses to the poles can also be predrilled.

Precutting and notching the poles before erecting them requires all concrete pole footings to be poured exactly level. Auger the postholes to the required diameter, allowing extra depth for the concrete footings. Set up a builder's level and tamp the top of all concrete footings to an exact, level line 1.4 m (4 ft 7 in.) below the 'datum floor level'. The precut poles, when erected into the postholes, will then guarantee a level roof line.

The plans also call for anchoring the poles against wind uplift. This can be done by drilling and crosspinning the butts of the poles and pouring a ring of concrete around the poles after they have been aligned in the postholes. If using several spikes instead of two steel pins, leave the spike heads protruding 25-40 mm (1-1 1/2 in.).

STACKING ROUND BALES The poles and roof trusses are not designed to withstand bales piled or tumbled against them. Based on the largest 1.8 x 1.5 m bale size, Figure 2 shows one way to systematically pile a maximum number of bales with minimum risk of pile collapsing. The 5.7 m (19 ft) interior height leaves enough clearance under the trusses to easily insert the third layer of bales. The 12 m (40 ft) clear span truss allows enough width to stack six bales across.

STORAGE CAPACITY Using the stacking pattern and bale size shown in Figure 2 and allowing 540 kg (1200 lb) per bale, each 2.4 m (8 ft) of building length will hold 12 t (13.6 tons) of dry hay.

With rectangular bales tightly stacked to within 0.6 m (2 ft) of the trusses and based on a density of 130 kg/m^3) (8 lb/cu ft) each 2.4 m (8 ft) bent will store 17.5 t (19.3 tons) of day hay.

PROTECTING THE WALLS If round bales are stored in a building with closed walls, the inside of the wall framing and cladding is particularly vulnerable to damage by the bale-handler. Two sturdy horizontal rails are suggested to protect the walls. The height of these rails was chosen to suit the largest 1.8 x 1.5 m (6 x 5-ft) round bales; for smaller bales the height of these rails could be reduced accordingly.

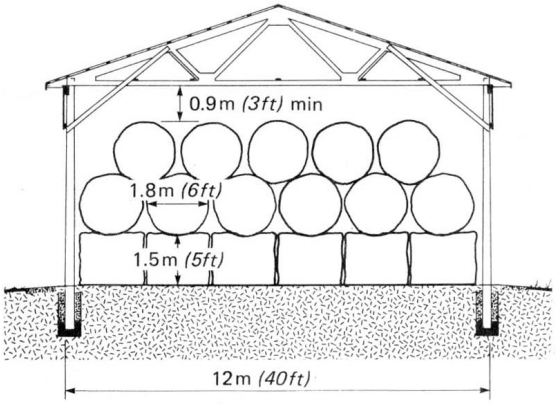

Figure 2 Suggested stacking pattern for the larger 1.8 x 1.5 m (6 x 5-ft) round bales.