

INDIVIDUAL FREE-STALL HOUSING FOR DAIRY CATTLE

G. W. Cleveland
Extension Dairyman

LIBRARY

OCT 11 1968



AGRICULTURAL EXTENSION SERVICE UNIVERSITY OF IDAHO
COLLEGE OF AGRICULTURE

AGRICULTURAL EXPERIMENT STATION
UNIVERSITY OF IDAHO

Free-stall housing for dairy cattle has several major advantages. One of the most important factors is the reduction in the amount of bedding required. Also cows can be kept much cleaner with less labor.

The partitions between the stalls also give the cows more privacy which they seem to like very much. Free-stall housing requires less space per cow than loose housing. Free-stall housing makes it possible to use mechanical equipment to remove manure from the alleyways.

However, the management of free-stall housing also presents several problems. Ordinarily every farmer has a few cows that may refuse to use the stalls and, thus, become dirty from lying in the alleyways or outside. There are problems and difficulties in the handling of the semi-liquid manure, especially in some areas where it is extremely cold and there is some build-up of manure for several days. As this thaws out, usually a problem arises. If a liquid-manure handling system is used, a high capital investment is required.

STALLS

In discussing stalls for free-stall housing—after observing stalls throughout Idaho and other states and viewing the varying widths from 3 feet 9 inches to 4 feet 6 inches and varying lengths from six and one-half feet to 8 feet—the following recommendations are made:

Width of Stall. The width of stalls should be 4 feet. Cows seem to shy away from extremely narrow stalls. Stalls for heifers or for very small cows may be slightly narrower, but not less than 3½ feet. The important thing is that the animals should not be able to turn around in the stalls.

Length of Stall. Stalls should be at least 7 feet 6 inches long for Holsteins and 7 feet for smaller breeds. Table I discusses proper size of

stalls. The cows can be held to the rear of the stall with a neck board or cable located approximately 2 feet from the front of the stall, as shown in Figure 1. The advantage of the neck board is that it allows the use of longer stalls with more space for the cow's head after she lies down. Stalls as long as 8 feet work well when neck boards are used. Use the following table to find the recommended size of stall:

Table I. Stall size as determined by size of cow.

Average weight of herd	Width of stall	Length of stall
1,100 pounds or less	4 feet	7 feet
1,100 to 1,500 pounds	4 feet	7½ feet
1,500 pounds and over	4 feet	8 feet

Stall partitions. Stall partitions can be made of lumber or pipe. The partitions must be constructed of sturdy material and fastened securely or the cows will break or bend them.

Experienced operators have found it desirable to angle the stall partition post away from the alleyway as shown in Figure 1. This angling of the post gives extra clearance for the hub of the tractor wheel when scraping the alleyway.

Some dairymen have constructed the partitions so they can be removed in case a cow gets down in the stall. This can be accomplished by having every other partition in a line of stalls bolted or otherwise installed so it can be removed without tearing out a partition to remove a dead or down cow.

A 2" x 6" brace placed across the top of the partition posts, 5 feet above the curb, helps provide rigidity to the partitions and may also help to prevent cows in heat from riding the cows in the stalls. Figure 2 shows such a brace across the top of the partition posts. Partitions should be 4 feet high above the curb with the bottom board or pipe of the partition being 18 inches from the ground.

Homemade stall partitions constructed with lumber seem to work as well as any of the commercial stall partitions. Figures 1, 2 and 3 show plans for typical stalls that can be constructed on the farm.

Figure 3 shows metal stalls with four pipes in the partition. Some dairymen are using only two pipes or partition boards with satisfactory results.

Curbs. Curbs can be made either from concrete or treated plank. The height of the curb depends somewhat on how far the operator must scrape the manure in the alleyway. Where the manure must be scraped long distances, a higher curb should be provided to prevent manure from building up and spilling into the stalls. Curbs should be from 6 to 10 inches high, with 8 inches being a good general recommendation. Cement curbs are shown in Figures 1 and 3 and treated planks in Figure 2.

Bedding. Many different types of bedding can be used including crushed corn cobs, chopped or long straw, sawdust, shavings, wood chips, or even chopped cornstalks. Sawdust, shavings, or straw seem to make our most-liked bedding. The long straw is used in a lot of places. It is a good bedding, but it has a tendency to work out of the stall a little more than some of the other beddings. Long straw also presents more of a problem with some liquid manure systems.

Materials that can be used for the base under the bedding include dirt or sand. These two are preferred. A person should use some type of fill that packs solid and gives a good base for the bedding. Gravel doesn't work well because it does not pack and seems to work up into the bedding. Concrete is not recommended for free stalls, but is used in some places where old barns have been converted. A good bedding of sawdust or other material put over the concrete also seems to work quite well.

Under some conditions, the cows have quite a tendency to dig the dirt fill from under their front feet. When this is a problem, some dairymen have poured a two-foot apron of concrete extending back from the front of the stall.

ALLEYWAYS

The width of the alleyway will be determined by cow numbers and by the equipment to be used. The minimum width of any alleyway should be 8 feet with 10 to 12 feet preferred. The longer the alley, the greater the cow traffic. Thus the need for a wider alley. Greater width in the alley gives more room to use the cleaning equipment and also allows the cows to pass each other. Therefore, the boss cow cannot block the entire alley. The alleyway should be made of reinforced concrete at least 4 inches thick. Reinforced concrete provides plenty of support for tractors and the equipment for hauling the bedding and removing manure. In constructing the alley, wood-float the concrete to leave a rough surface for better footing.

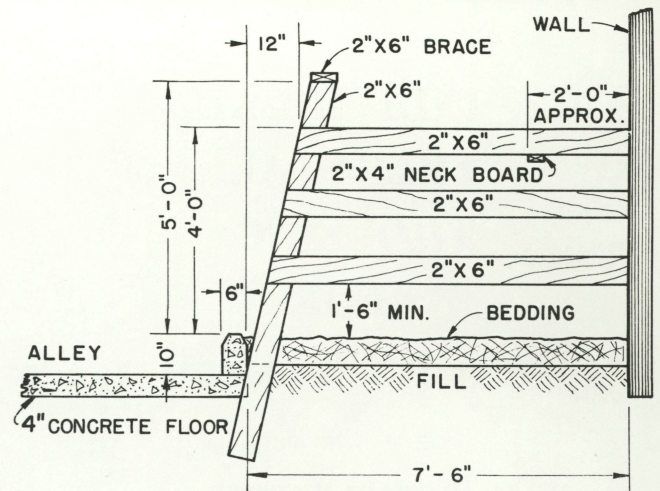


Figure 1. Side view of an individual stall with slanted posts. Posts must be securely anchored at the bottom, either with a steel pin or steel plate on the concrete curb, or extended into the ground. If posts extend into the ground, they should be treated.

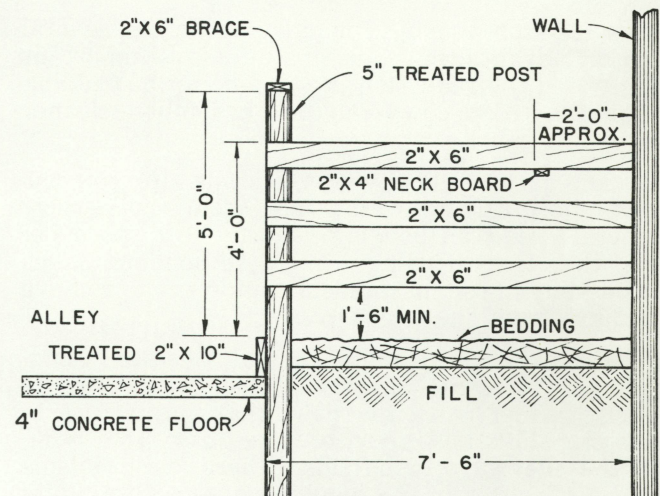


Figure 2. Side view using a round post with a 2" plank as a curb. Both the post and the plank should be treated.

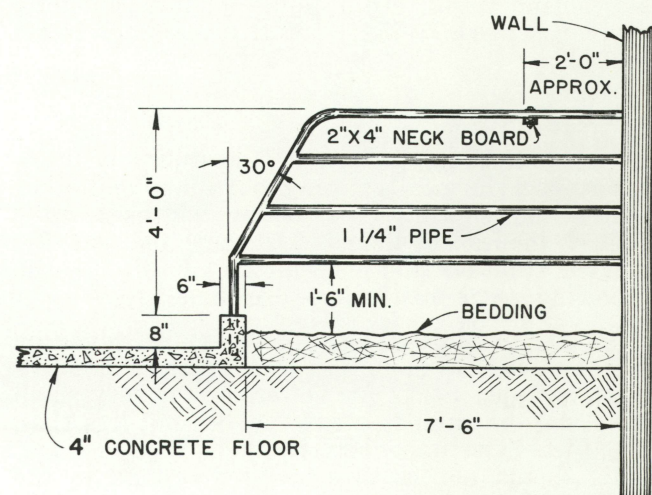


Figure 3. Side view of free-stall partition made with pipe. This stall could be constructed by using two or three 1 1/4" pipes instead of four as shown in the diagram. All diagrams show 2 x 4's for neck boards. A cable or pipe can also be used.

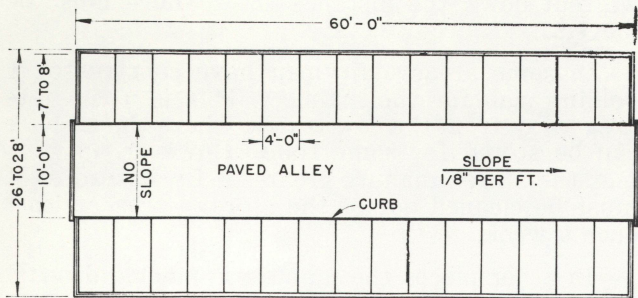


Figure 4. Two lines of stalls with cows facing out. Central alleyway 10 to 12 feet. Double doors on each end can be left open in summer with one being closed in the winter.

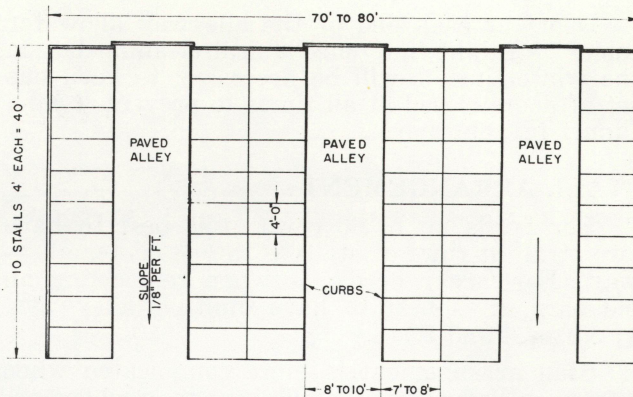


Figure 5. One of the many arrangements that can be used when converting loose-stall housing to free-stall housing.

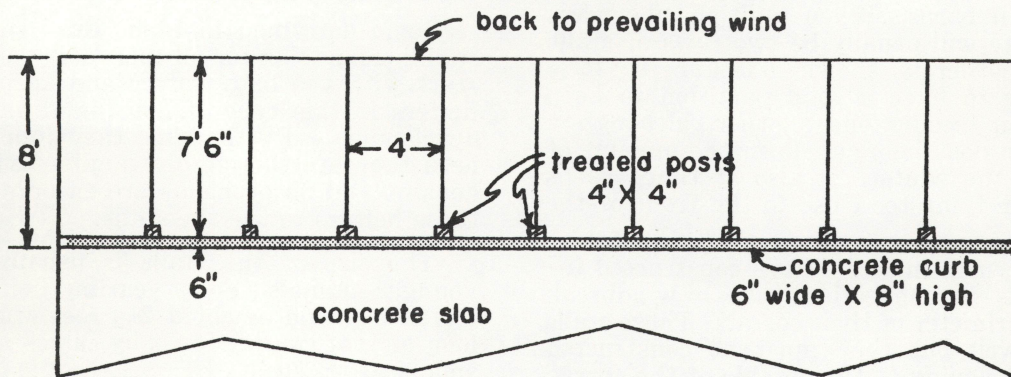


Figure 6. Single row of stalls built along a windbreak. These are especially good for heifers or dairy cows in milder climates.

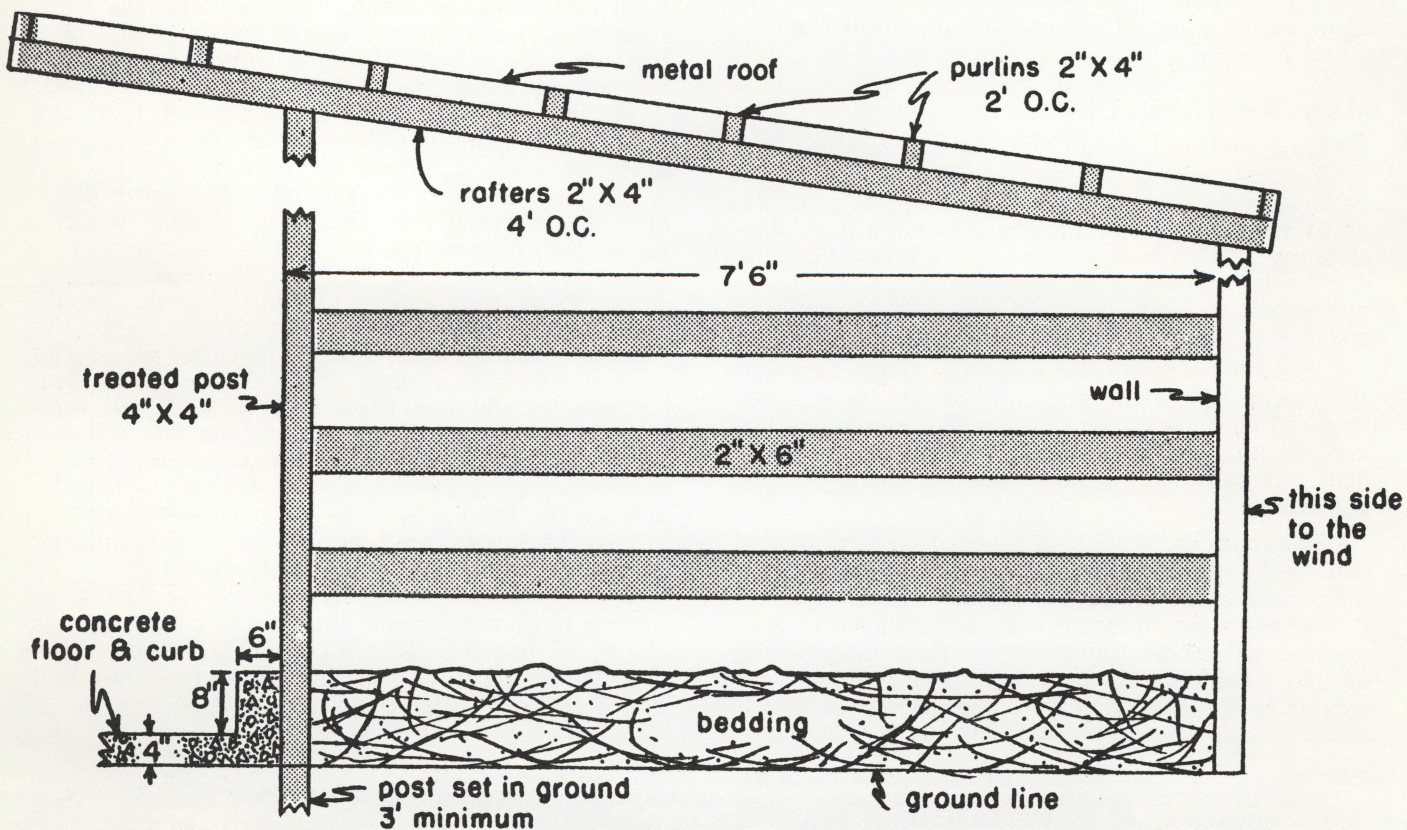


Figure 7. Side view showing covering for stalls around perimeter of a corral.

Doors at each end of the alleyway allow for easier "straight line" mechanical cleaning but in the wintertime it will be necessary to keep one set of doors closed at all times to prevent a wind tunnel in your barn.

STALL ARRANGEMENT

For herds up to 60 cows, it is best to have two straight rows of stalls with one center alleyway. For larger herds, or when remodeling an old barn, it is best to have multiple alleyways. (Figures 4 and 5.)

Stall arrangement is more complicated when fitting stalls to existing buildings than when constructing new facilities. Using multiple alleyways which run across the barn is usually the best plan when converting loose-stall housing to individual-stall barns. When multiple alleyways are used, there will usually be two rows of stalls facing one another as shown in Figure 5. It is not necessary to have a solid partition to keep the cows from seeing one another, although a solid partition does help cut down the amount of draft during the winter. It also at times keeps the cows from lying too close to the front of the stall.

Some dairymen in Idaho have constructed individual stalls in connection with a windbreak around the perimeter of their corrals. These stalls work quite well but they must be constructed with the roof sloping to the outside of the corral. This keeps the rain and snow drained to the outside instead of in the corral. There should be a strip of concrete around the perimeter, just outside of the curb. Thus this area can be kept clean and manure will not track into the stall. The dimensions of these perimeter stalls are the same as for other stalls and are shown in Figures 6 and 7.

MANURE HANDLING

Manure that falls in the stall, or is deposited in the stall when the cow is lying down, should be cleaned into the alleyway as often as possible. Many operators clean the stalls twice a day. The cleaning of this manure into the alleyway can be done very quickly with a garden rake or with a pitch fork so that the stalls are kept as clean as possible.

The alleyways should slope the same direction the manure is moved and they should be scraped, if possible, once a day. Unless the alleyways are kept clean, this system of housing dairy cattle does not gain the big advantage of cleanliness of the cow.

The manure, after it is scraped from the barn, can be handled in several different ways. This manure does not have much bedding or straw in it. Where a liquid-manure system is used in connection with free-stall housing this manure can be deposited directly into the liquid-manure system as it is taken from the barn. Where a liquid-

manure system is installed, the tank opening should be close to the end of the alleyway. This will cut down the distance the manure must be moved.

In some areas, dairymen have constructed a holding slab for the manure. This is a concrete area away from the cow traffic where the manure can be stored for some time. However, in summer the stored manure creates a fly hazard so it must be cleaned out of the storage area at least once a week.

In other places the manure is pushed directly into a manure spreader. This can be done unless the manure has too much liquid material. In some set-ups, loading ramps have been constructed; the manure is pushed directly from the barn onto the loading ramp and into a spreader.

Some dairymen in Idaho are using the free-stall housing plan for all their dairy animals. They start with the baby calves and keep all sizes of heifers in this type of housing throughout their development. By the time they join the milking herd they are thoroughly familiar with free-stall housing and no problems are encountered getting these heifers to use the stalls.

The size of the stalls is usually varied for younger animals. For a yearling heifer the average size should be about 2½ feet wide and 5 feet long and, of course, for baby calves must be even smaller.

GENERAL MANAGEMENT SUGGESTIONS

General suggestions in connection with free-stall housing are summarized as follows:

A well-managed, properly designed free-stall barn results in low bedding costs, clean and comfortable cows, efficient use of labor, and fewer injuries. To get all of these things, the following management practices should be considered:

(1) Rake the manure that is dropped from the stalls into the alleyway once or twice a day to keep the bedding as clean as possible.

(2) Scrape the alleyway with a tractor blade or a scoop every day. Make it possible for the cows to go outside the barn while the alleyway is being scraped.

(3) Cows that refuse to use the stalls should be encouraged to do so by leading them into the stalls, or perhaps even tying something across the back of the stall to help break the habit of lying outside. Some dairymen have had to cull individual cows because they will not use the stalls.

(4) Do not feed cows in the stalls.

(5) Separate cows that are in heat from the rest of the herd.

(6) Don't run bred heifers with the milking herd until about a month before calving.

(7) Allow the cows free access to the barn during both winter and summer. In the summer they will use the barn for shade and protection from flies and in the winter, of course, they will use it to keep comfortable.