Paved floors and lots for Iowa farms

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Paved FLOORS And LOTS FOR IOWA FARMS

AGRICULTURAL EXPERIMENT STATION—AGRICULTURAL EXTENSION SERVICE, Cooperating
IOWA STATE COLLEGE
AMES, IOWA

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Paved Floors and Lots For Iowa Farms

By Harold H. Beaty and C. H. Van Vlack.

PAVED YARDS and feeding floors are a valuable asset on livestock farms, particularly where lots are flat and poorly drained. At no time are paved yards more appreciated than during periods of prolonged rainfall or in the late winter and early spring when frost thaws out and yards are seemingly bottomless.

Livestock farmers who have enjoyed the use of paved yards and feeding floors will tell you that these improvements offer the following advantages:

Livestock not forced to waste energy in wading through knee-deep mud make more rapid gains. Paved yards can be kept sanitary, which means healthier, more thrifty animals. Chores are made easier. More manure is saved for producing bigger crops. Feed is saved because it is not trampled into the mud. This is important for hogs following steers. For the dairyman, a paved strip keeps the barn and cows cleaner and it reduces labor necessary for washing the cows before milking. Where yards are sloping, pavement prevents soil erosion in rainy weather; prevents undermining of foundations from eaves-drip.

Fig. 1. Refuse is easily scooped up on paved barnyards. Manure is not trampled into the mud.
Fig. 2. Steers cannot do their best in a muddy feedlot. Feed is wasted in the mud and gains are slow and costly.

Fig. 3. A strip of concrete along the barn provides a place for cattle when yards are muddy.
COST OF PAVED YARDS AND LOTS

Materials for the construction of 4-inch thick paved floors or lots ordinarily cost 8 to 10 cents per square foot or 8 to 10 dollars for a 10-foot square section.

PLANNING PAVED YARD

Careful planning should precede the construction of paved areas because of their permanent nature. The location of the paved lots should be carefully determined, keeping in mind such factors as the number and kind of animals to be enclosed; the relation of the lots to the livestock shelter buildings; the protection afforded the lots in winter by buildings or other windbreaks; nearness to feed and water supplies and the possible future expansion of the farm plant. Yards should be planned with a view to providing ready access to water tanks and feed supplies. Lanes through which there is much hauling or through which many animals pass can often be paved to advantage. Careful planning will save time, work and money.

SIZE PAVEMENT OR FEEDING FLOOR TO BUILD

Usually 30 to 40 square feet of paved area is allowed per cow. Mixed herds of large and small animals will require less space per animal. Paved lots can be smaller than unpaved lots because the entire area is available for use in all seasons.

Hog feeders recommend about 10 to 15 square feet of floor area per hog.

BUILDING THE PAVED YARD OR FEEDING FLOOR

The lot may be paved all at once or a section at a time. The concrete slab is usually made 4 inches thick. If it is to be driven over with heavy loads it is made 6 inches thick. If the lot to be paved is poorly drained it is best to place the concrete slab on a well-tamped fill of about 6 inches of

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Fig. 4. On flat, level land, barnyards are likely to be churned up into knee-deep mud in rainy seasons unless paved with concrete.

Fig. 5. Careful planning of buildings and paved yards give this farmstead of Adams & Gertsen, Story City, Iowa, a spick-and-span appearance. It is often practically impossible to keep good bottoms in yards located on low, flat land unless they are paved with concrete.
gravel or cinders. However, if the feedlot is on well-drained soil, no fill is needed.

Before concrete is placed, the lot to be paved is carefully leveled and graded. Most paved yards are given a slope of \(\frac{1}{4}\) inch in 1 foot to drain readily. Any filling made in low spots should be wetted and tamped thoroughly to provide a firm base for the concrete. For side forms 2x4's are set on edge when the slab is to be 4 inches thick; 2x6's are set in a similar manner when the pavement is to be 6 inches thick. Used lumber is satisfactory for forms. The forms are set to make sections 10 feet square. The tops of the forms are used as guides in striking-off the concrete, and consequently should be set to have the same slope as the finished pavement. In some cases alternate sections of pavement are placed first. After these are hard the sections in between are placed. This results in construction joints 10 feet apart.

Another satisfactory method of construction is to build the floor in strips 10 feet wide. The forms are set up as described above except that no cross forms are required. A piece of half-round 1 inch across or a strip of board about \(\frac{5}{8}\) x 11\(\frac{1}{4}\) inches is tacked onto the face of the edge form as shown in fig. 11. This makes a groove in the edge of the slab. When the adjoining strip of concrete is placed it fills in the groove and the two strips are dovetailed together at the joints. This helps keep the surface of the pavement even. Dummy joints are cut across the strips of pavement at 10-foot intervals. The dummy joint can be made by drawing the blade of an ax across the slab after the concrete has become quite stiff, using the edge of a straight 2x4 as a guide. The surface should be cut through to a depth equal to one-fourth the thickness of the slab. The roughened
Fig. 7. Protected areas between buildings can be used for feedlots when paved with concrete.

Fig. 8. Large paved lots may be fenced into smaller yards by providing openings in the concrete in which posts can be set. Here 5-inch drain tiles have been set in the concrete to provide inserts for the posts. J. J. Newlin, Johnston, Iowa, operates this efficient plant.
Fig. 9. A paved yard or platform provides ready access to the watering tank in all seasons.

Fig. 10. A paved lane provides clean, easy going for the hogs in all seasons. Areas over which many feet must trample or over which many loads are hauled, serve their purpose best when paved.
edges of the joint should be smoothed down with an edging tool as used in sidewalk construction. These dummy joints and the joints between strips divide the paved area into 10 foot squares.

When a pavement is laid against a building or between two buildings or around a concrete water tank, it is recommended that a joint be provided where the pavement and the building or tank come together. A 1-inch board having a width equal to the thickness of the slab is set on edge against the building or tank wall. It is not removed after slab is concreted. If painted with old crankcase oil the board will last many years.

It is often desirable to place a low curb and an apron or cutoff wall extending into the ground about 1½ or 2 feet deep around the edge of a paved yard as shown in the drawing. This apron prevents undermining of the slab.

**CONCRETE MIXTURE**

A 1:2\(\frac{1}{4}\):3 concrete mix is recommended. This means 1 part Portland cement, 2\(\frac{1}{4}\) parts sand and 3 parts gravel or crushed rock by volume. Pieces of gravel or crushed rock should not be larger than 1½ inches. The proper amount of water is 5 gallons per sack of cement if sand is in an average moist condition. After thorough mixing, this should result in a mushy mix which will place and finish readily.
Fig. 12. This OR This?

Fig. 13. A concrete wallow as a part of the feeding floor improves sanitation, keeps the hogs cool and clean and if disinfectant is added can be used to control mange.
Fig. 14. Plans for the construction of a concrete hog wallow.
If these proportions result in a soupy mix, increase slightly the amount of sand and gravel in the next batch. If the mixture is too stiff, reduce the amounts of sand and gravel slightly. Do not change the proportions of water to cement because the durability and strength of concrete is dependent upon maintaining this ratio.

The full thickness of concrete is placed in one operation. The freshly laid concrete is leveled flush with the top of the guide forms by means of a strikeboard. A straight 2x4 about 12 feet or 14 feet long makes a good strikeboard.

After the fresh concrete is straightened it is allowed to stand until the surface sheen of moisture begins to disappear and the concrete begins to stiffen. Then the concrete is finished with a wood float. The wood float creates an even, uniform, gritty, nonskid surface. Use the wood float just enough to obtain the desired finish, but avoid overworking as this may result in scaling of the finished slab. Do not use a steel trowel because it tends to produce a slippery surface.

New concrete should be cured properly by covering with earth or straw as soon as it has hardened enough not to be marred, and then kept moist for at least 5 days by frequent sprinkling. Paved yards should be 2 weeks old before being put into service. The durability and strength of the concrete can be increased greatly by proper curing.
Fig. 15. 2x4's set on edge make good forms. Pavement is being placed in strips about 10 feet wide.

Fig. 16. Concrete is struck-off by means of a straight-edged 2x6 resting on the side forms and moved back and forth and forward in a saw-like motion.
Fig. 17. Clean sand, gravel and water of the right proportions are essential if good pavement is to be had. The proper proportion of water to cement determines the strength of the concrete. Two-thirds of a pail of water to 1 pail of cement is the correct ratio. Vary the amount of sand and gravel slightly to give a mushy consistency as shown above. Normally 2\(\frac{1}{4}\) pails of moist sand and 3 pails of gravel or crushed rock will be the correct amounts to add.

Fig. 18. Paved yards should be finished with a wood float which leaves an even, yet gritty nonslip surface. Never use a steel trowel in finishing a barnyard pavement or feeding floor.
ESTIMATING MATERIALS

Approximate amounts of materials* required to build 100 square feet of paved yard 4 inches thick are:
- $7\frac{3}{8}$ sacks of Portland cement
- $\frac{3}{4}$ cubic yards sand
- 1 cubic yard gravel or crushed rock.

For 100 square feet of paved yard 6 inches thick approximate amounts of material required are:
- $11\frac{1}{2}$ sacks of Portland cement
- 1 cubic yard sand
- $1\frac{5}{8}$ cubic yards gravel.

*If concrete aggregates are sold in your locality by weight you may assume for estimating purposes that a ton contains approximately 22 cubic feet of sand or crushed stone; or about 20 cubic feet of gravel. For information on local aggregates consult your building material dealer.