SILOS

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More Attention should be given to the Quality of Material used and the manner of Erecting and Maintaining the Silo than to whether the Silo shall be Wood, Concrete or Clay Tile

In Eastern Canada and the States the importance and value of the silo for furnishing succulent food for dairy cattle and other farm animals has been appreciated for some time. In the prairie provinces the silo has not yet come into general use in preserving immature crops, yet the last couple of years clearly shows that many farmers are building silos, and a very large number are considering doing so.

The first silo erected in Manitoba of which the writer has a record was erected in 1908. The second was constructed in 1910, and in 1913 there were less than a dozen in use. Today there are over fifty. This shows conclusively that even in one province, on land that a few years ago was considered out of the corn belt, farmers are growing corn to such an extent that fifty 100-ton silos are constructed and many will be built this year.

Airtightness

There are several requirements of a silo. First of all airtightness must be considered. The fundamental principle in the preserving of the green forage crop is the exclusion of air. Rotten silage is the direct result of the admission of air. Besides having airtight walls, the walls must be rigid enough to withstand the outward pressure of the silage, which is about eleven pounds per foot for every foot in height of the silo. That is, a thirty-foot silo, if full, has a bursting pressure of 330 pounds on every square foot toward the bottom. If the walls are not rigid they bulge, air is admitted, and the result is spoiled ensilage.

Another requirement is that the walls are made smooth inside. A smooth, perpendicular wall permits even settling of the ensilage, thus eliminating air pockets. If the silo extends below the ground, as little shoulder as possible should be formed where the silo rests on the foundation.

Size of Silo

The silo must be deep, for depth means compacting. The depth should be in proportion to the feeding period. It is recommended that two inches be fed off the surface daily, to prevent spoiling. Especially is this true if the feeding period extends into the warm weather. Feeding at least an inch and a half or two inches a day from the surface, means a foot per week, thus, if the feeding period is to be twenty-four weeks, the silo should be thirty feet high, allowing five feet for settling.

The diameter of the silo should depend to a large extent on the number of animals and the amount fed per animal. Generally the diameter is about one-half the height. It is not advisable to build a silo of too large a diameter, on account of the bursting pressure being too great.

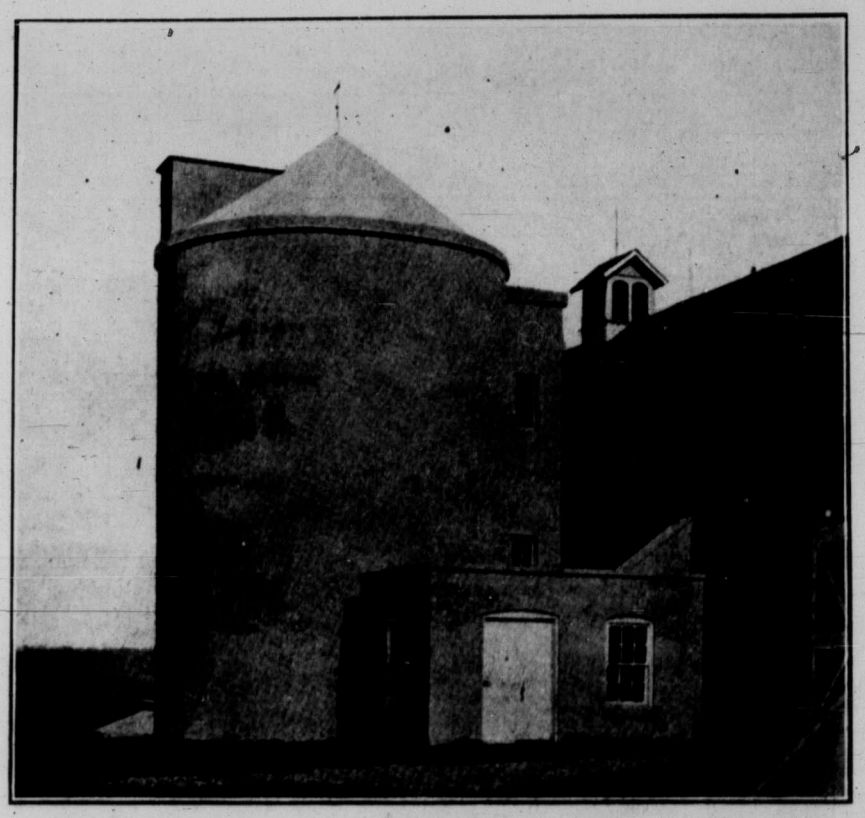
To determine just the size of silo required for any particular herd the following two tables will be found useful. The Iowa State College gives the following as the amounts of silage required per day for various kinds of stock:

Kind of Stock.	Daily Rations. Lbs.
Beef Cattle:	
Wintering calves, 8 months old	15 to 25
Wintering breeding cows	30 to 50
First stage of fattening beef cattle (18 to 20 months)	20 to 30
Last stage ditto	12 to 20
Dairy Cattle	30 to 50
Sheep:	
Wintering breeding sheep	3 to 5
Fattening lambs	2 to 3
Fattening sheep	3 to 5

In conjunction with this table the following one, giving the capacity of round silos, and compiled by the Iowa Experiment Station, will be easily used.

Inside diameter, feet.	Height, feet.	Capacity, tons.	Amount to be fed daily, pounds.
10	28	42	525
10	30	47	525
12	28	61	755
12	30	67	755
14	28	83	1030
14	30	91	1030
16	28	108	1340
16	30	119	1340
18	30	151	1700
18	34	181	1700
20	30	187	2100
20	40	281	2100

In calculating the size of silo required it must be first determined how much silage will be required to be fed each day. This obtained, a reference to the second table will show the proper size of silo to build. These figures have been estimated on a basis of two inches of silage being fed from the silo daily. The point in this is that silage more or less readily moulds on exposure to air, and this being the case, as little as possible should be left each day for the air to act upon. If well packed, air will not penetrate the two-inch layer in a day. The chief importance rests with determining the right diameter to use for the silo. Then, since two inches are to be fed daily and the feeding period may extend over six months, or 180 days, 360 inches or 30 feet will have to be figured on as the final height of the silage. Silage will settle about one-sixth, depending upon the time spent in filling, so that not less than 35 feet in height should be figured on in this case.



A solid concrete silo. This is an expensive construction, but such a building is practically indestructible. Note feed room provided with chute for cut feed leading from barn loft.

It is a better plan to build two small silos than one large one. If it be a stave silo and the diameter is large, there is much strain on the hoops. If the silo is concrete there should be ample reinforcing put in to withstand this pressure and that caused by the contraction and expansion of concrete.

Besides airtightness, rigidity of walls and size, there are such things as appearance, frost resistance, durability, and cost, this last being of vital importance.

Materials for Construction

Several materials are used to construct silos, such as wood, iron, stone, cement, with solid or hollow wall, concrete blocks, and clay tile. Brick also is used to some extent, but the cost is high. Of these materials the wood silo is in more general use in Western Canada and has many advantages. The common type of wood silo is the stave silo. The durability of this silo depends largely upon the kind of lumber used in its construction. Redwood, cypress, fir, tamarac, white and yellow pine are all used. Stave silos, when properly constructed of good material, will remain in good condition for fifteen or more years. There are many instances, however, where the stave silo blew over inside of a year after it was erected, because proper care was not taken in keeping the hoops tightened.

Not all silos in Manitoba are of the wood stave type. There are concrete silos which are giving excellent satisfaction. The objection to the concrete silo is the first cost. If a good grade of gravel is available a good concrete silo can be built at a cost not much exceeding that of a stave silo. However where but a single silo is to be built and a good gravel is not convenient, the stave silo is much the cheaper. Labor and materials are expensive to build forms for erecting concrete silos, which brings the cost of a single silo very high. From the standpoint of durability and fireproofness concrete must be given first place.

Stave silo on the farm of C. W. Weaver, Deloraine, Man. This silo, on a quarter section farm, provides succulent fodder all winter for a large herd of pure-bred Holsteins.

Freezing in Silo

On the question of freezing in silos it is interesting to note from reports on twenty silos in Manitoba that the concrete silos compare very favorably with the wood stave silo. In fact the average freezing around the surface of stave silos in 1914 was a little more than 12 inches, while with the concrete freezing was reported to be but 8 inches. Generally there is more freezing than these figures show and in some cases the freezing is reported as being as high as 30 inches around the surface. Farmers in general in Manitoba throw out into the feed room the frozen silage along with the other and it is left until thawed. On two farms steam is used to thaw the ensilage and in a few cases the frozen ensilage remains standing until spring and is then fed. This latter practice is hardly recommended, as the thickness of frozen silage generally increases if once left. If care is taken, the freezing is not a serious objection, as when thawed out the animals eat it as readily as that which was not frozen, and it is claimed that its feeding value is practically the same.

The Stave Silo

By far the largest number of silos, especially those in Manitoba, are wooden stave silos. Unquestionably such material makes a very satisfactory silo. More attention should be given to the kind of staves used, and the manner of erecting and maintaining the silo, than to whether the silo shall be wood, concrete, or clay tile.

To construct and erect a stave silo is comparatively easy, and practically any farmer, if he so desires, can, with a little help, build his own silo. The most common practice is to use a scaffold when building, but many men have had success without using any scaffold at all. The plan in this case is to build up the sides in sections on the ground first and then raising them into position when all are ready. Staves for silos 12 feet or over in diameter should be 2 inches thick and from 4 to 8 inches wide, commonly they are 6 inches wide. These are tongued and grooved and held together by steel hoops, joined at the end with malleable iron lugs and nuts. The door frame is put up first and guyed solidly in position. Then a section consisting of three or four staves tacked lightly together with three pieces of barrel hoop—one at each end and one in the middle, the staves projecting out six or eight inches on each side of the sections, so as to afford support for the next, is pulled up by means of a pulley and rope on the door frame into position. The same is done with a section on the other side of the door frame. This process is continued, alternating sections on each side, until the circle is completed. It is best, when four or five sections are in place, to brace the top with a 2 by 6 or 2 by 8 piece. When the sections are all in place the hoops can be put on. The first to be used may need an extension piece to enable its being started, and it is best to tighten this one up as the second from the bottom. When this is pulled tight the remainder of the hoops can be readily

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