MAKING TRENCH AND STACK SILAGE

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Federal Cooperative Extension Service
Oregon State College
Corvallis

Extension Circular 552 March 1953

Cooperative Extension work in Agriculture and Home Economics, F. E. Price, director. Oregon State College and the United States Department of Agriculture cooperating. Printed and distributed in furtherance of Acts of Congress of May 8 and June 30, 1914.

MAKING TRENCH AND STACK SILAGE

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It is possible to make grass-legume silage even though the usual upright silo is not available. The forage can be ensiled in a trench or a stack. Under average conditions, while not as efficient as the conventional tower silo, trenches and stacks can be satisfactory methods of ensiling if proper precautions are taken. Furthermore, initial costs may be less. Also there are possibilities for saving labor in making and feeding trench or stack silage which may offset any disadvantages of these methods and make them practical.

Storage losses in trenches, stacks, and conventional tower silos will vary considerably. Losses are due (1) to chemical and bacterial actions that destroy feed nutrients while changing the green crop into silage, (2) to rotting and molding (spoilage) caused by air at the surface of the silage or in poorly packed silage, and (3) to loss of readily soluble nutrients caused by a high moisture content of the crop or excessive rainfall on uncovered silage.

Studies by the Bureau of Dairy Industry at Beltsville, Md., indicate that if careful methods are used in making and feeding silage the amount of good silage available for feeding will range from 60 to 80 per cent of the crop when stored (long or chopped) in sealed stacks and from 75 to 85 per cent when stored in sealed trenches, as compared with 80 to 90 per cent in properly reinforced conventional tower silos, and 90 to 95 per cent in gas-tight, glass-lined steel silos.

Losses will usually be greater with stack or trench silage.

METHODS OF STORING SILAGE

1. Upright silo: wood, concrete, metal, or tile.
2. Temporary upright: snow fencing or similar material lined with a heavy paper.
3. Trench: concrete or wood-lined or dirt wall.
4. Horizontal above ground: wood or concrete retaining walls or stacked without walls or cover.

Good silage may be stored successfully by any of these methods. The dry matter losses will vary with the methods of storage and the care used in properly placing the forage in the storage pile.

HOW TO DECIDE WHICH METHOD TO USE

1. Feed area in relation to silage storage. To save labor the two must be close together or equipment and conditions already available and suitable for economical handling of the silage. The upright silo with unloader and conveyor may be more practical.

2. The equipment available for silage making. Trench silos are easier to fill. Stack or above-ground storage with retaining walls requires a bulldozer or some device for distributing the forage over the storage area. A conveyor can be used at less cost than a blower.

3. The cheapest method. Which method is cheapest in terms of annual cost per ton of feed conserved per acre?

The storage losses and increased labor with a particular trench or stack method may be more costly than an upright silo with the necessary filling and feeding equipment. Many beef-feeding operations are adapted to the trench or stack method. The same may be true of dairy operations where the entire layout may be planned for economy of labor and material.

BUILDING A TRENCH SILO

1. Select a well-drained site.
2. Locate close to the feed area.
3. Locate for easy filling with truck or trailer.
4. Heavy clay soils may not need side walls, but as a rule wood or concrete walls are desirable.

The trench may be made in a hillside, in which case one end is left open for removal of the silage. On a gentle slope, dirt from the deep end may be used to build sides at the lower end. When dug on level ground there must be adequate all-winter drainage. Sometimes both ends are sloped so that unloading trucks or trailers may drive straight through. Some soils are not suitable for trench silos, and concrete, cement block, or wood must be used for the sides and floors. Details of construction are shown in the plans for both trench and above-ground storage.

Drainage

Drainage for surface and ground water must be provided along each side near the floor and wall. The floor should slope toward the one end. Drainage should also be provided to relieve the water pressure in wet periods that may occur behind the walls. Water pressure could overturn or collapse the walls. Weep holes in the masonry or concrete walls near the floor are recommended. Gravel or tile placed behind the walls is also advisable.

Slope of Side Walls

This is important for grass silage to obtain good settlement and a minimum of spoilage. Steep slopes 1 to 2 inches per foot are ideal. Dirt walls require more slope, depending on type of soil.

Size to Build

Figure three tons of silage to one ton of hay, equal quality. For silos 10 to 15 feet deep figure an average of 35 to 40 pounds per cubic foot and up to 10 feet deep about 30 to 35 pounds per cubic foot.

Roofs

Silage should be protected against excessive rain.

MAKING TRENCH SILAGE

1. Forage may be put in long or chopped. It is much more desirable to have the forage chopped as this makes easier handling when feeding and ensures better ensiling.
2. Forage may be dumped into the trench--no blower or conveyor is necessary.
3. Crop may be put in right from the stand as cut. A better quality silage will result from slight wilting if crop is immature and high in moisture. The use of preservatives such as grain, molasses, or beet pulp is a good practice.
4. Forage should be evenly distributed and well packed by running a tractor over the surface.
5. Forage should be about 2 feet higher at the center than at the sides.
6. The top may be covered with 6 to 18 inches of soil or sawdust to prevent top spoilage.
7. Heavy paper may be used under the sawdust.
8. Top should be kept wet and packed daily at least a week when not sealed with sawdust or dirt.

MAKING STACK SILAGE

Above-ground storage may be made with or without retaining walls. The latter method is much more desirable.

Follow the same procedure as with trench filling.

Small stacks without retaining walls should be covered completely to prevent excess spoilage.

HOW LOSSES MAY OCCUR

Fermentation losses occur even in well-made silage, usually to the extent of 5 to 10 per cent of the total nutritive value of the silage. Losses from fermentation will be higher if the silage is made without excluding the air sufficiently and if heating occurs.

Top spoilage to a depth of 12 inches represents about 4 per cent of the total volume if the silage is 20 feet deep, 8 per cent if it is 12 feet deep, 12 per cent if it is 8 feet deep, and 25 per cent if it is 4 feet deep.

Side spoilage 12 inches thick around the sides of a round stack represents about 8 per cent of the total volume if the diameter of the stack is 40 feet, 17 per cent if the diameter is 20 feet, and 25 per cent if the diameter is 15 feet.

Poor compaction increases the depth of spoilage, both on top and at the sides, and increases the amount of heating beneath the spoilage. Excessive rainfall on open trenches and stacks causes additional losses through the

leaching out of soluble nutrients; and a rain-soaked silage is reduced in palatability. Total losses in poorly constructed open trenches and stacks could easily amount to 40 to 50 per cent or entire loss of the feeding value of the crop stored.

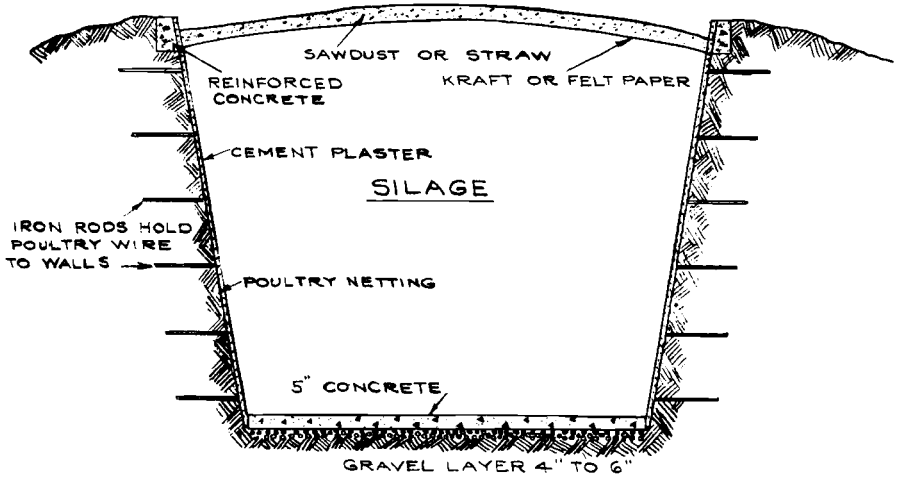
For additional information on grass silage and silos refer to:

Farmers' Bulletin 1820, Silos - Type and Construction.
O.S.C. Extension Bulletin 715, A Homemade Wood Stave Silo.
O.S.C. Extension Bulletin 669, Making and Feeding Grass and Legume Silage.
O.S.C. Station Circular of Information 518, Mechanical Feeders for Silage.

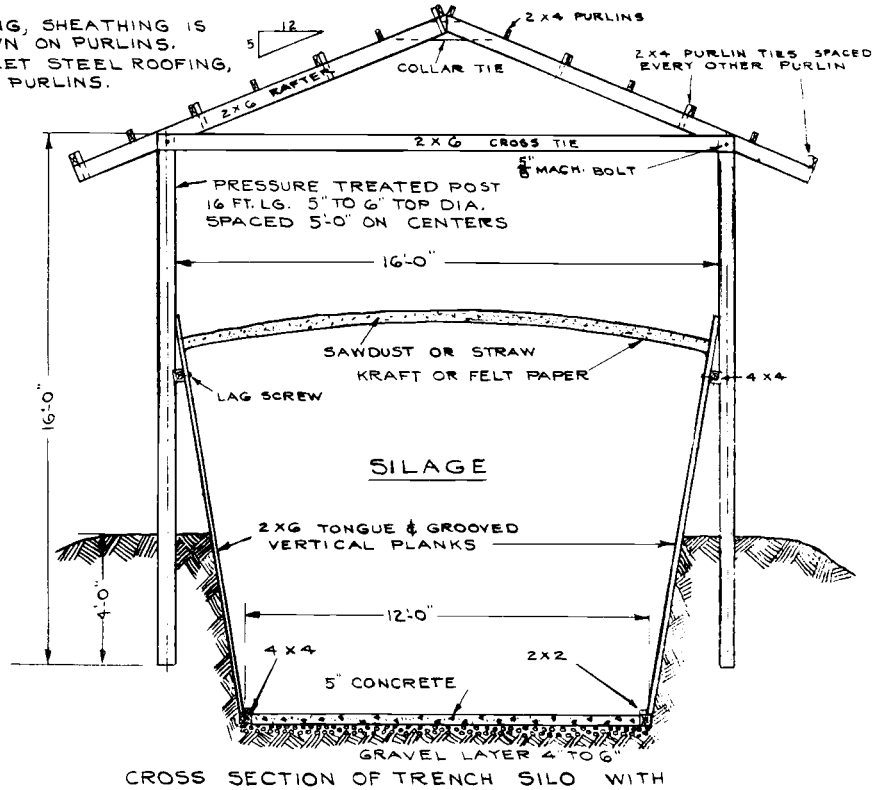
TRENCH SILO

FOR ASPHALT ROOFING, SHEATHING IS APPLIED UP AND DOWN ON PURLINS. FOR GALVANIZED SHEET STEEL ROOFING, APPLY DIRECTLY ON PURLINS.

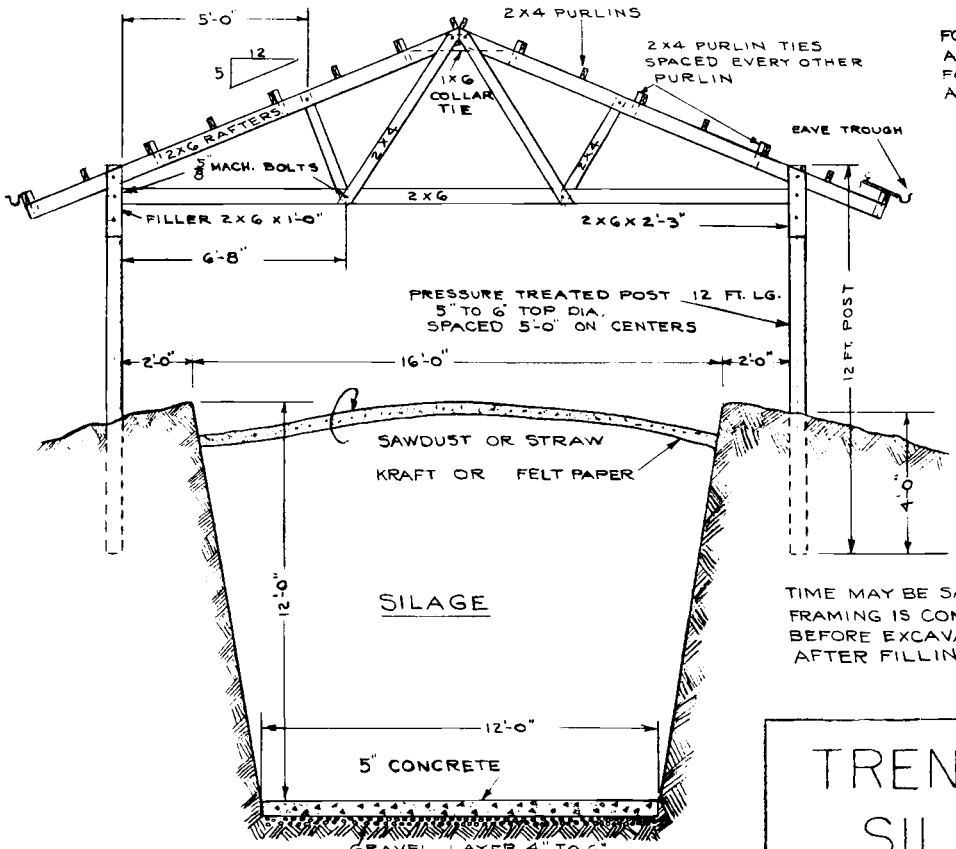
SCALE 12" 6" 0" 1' 2' 3'



CROSS SECTION OF TRENCH SILO WITH REINFORCED CONCRETE CURB AND PLASTER LINED



CROSS SECTION OF TRENCH SILO WITH CREOSOTED PLANK-LINED CONSTRUCTION



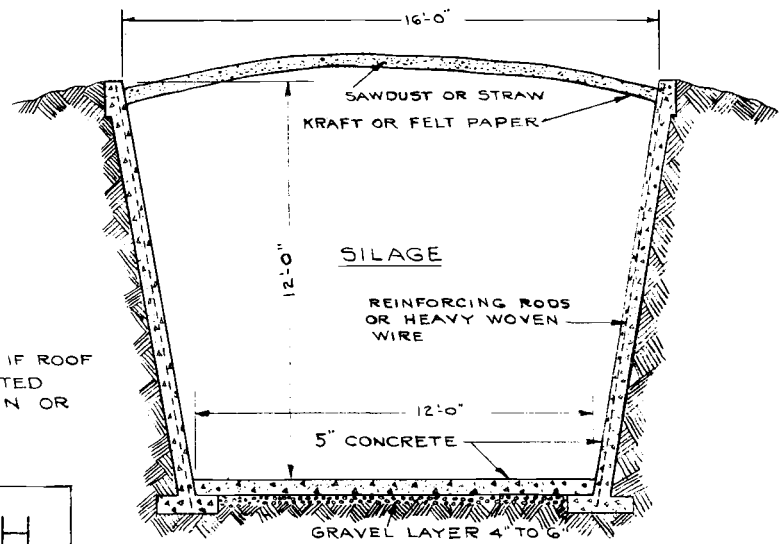
CROSS SECTION OF TRENCH SILO WITH ROOF CONSTRUCTION

FOR ASPHALT ROOFING, SHEATHING IS APPLIED UP AND DOWN ON PURLINS. FOR GALVANIZED SHEET STEEL ROOFING, APPLY DIRECTLY ON PURLINS.

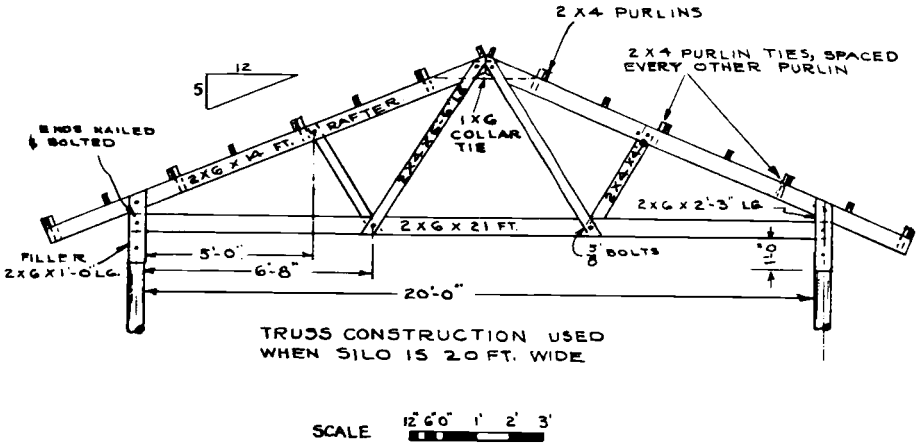
SCALE 12" 6" 0" 1' 2' 3'

TIME MAY BE SAVED IF ROOF FRAMING IS COMPLETED BEFORE EXCAVATION OR AFTER FILLING

TRENCH SILO



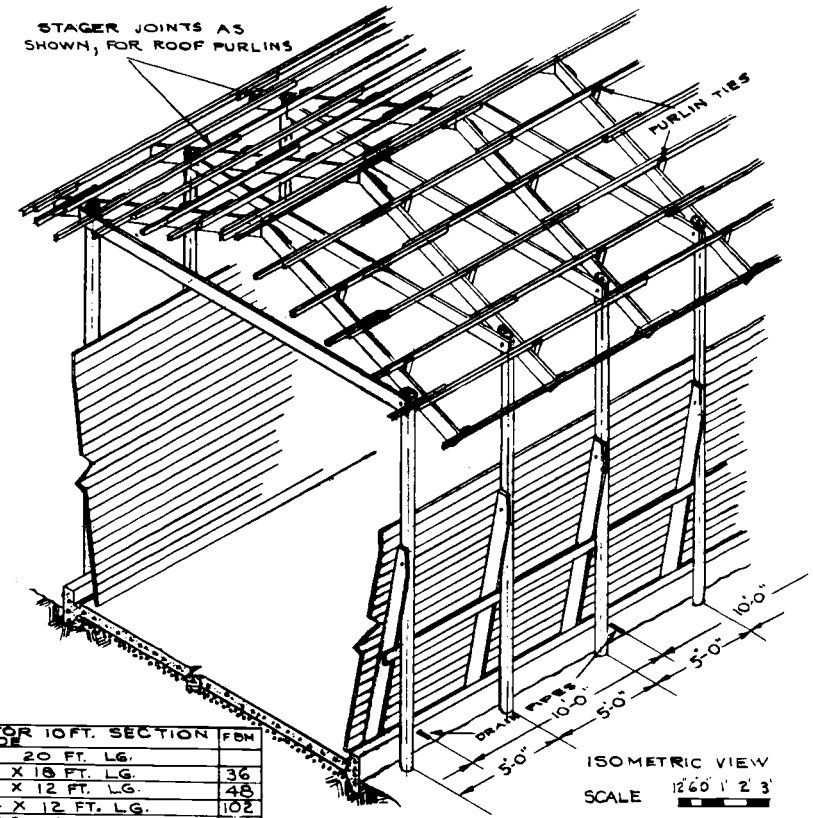
CROSS SECTION OF TRENCH SILO WITH REINFORCED CONCRETE WALLS



TRUSS CONSTRUCTION USED WHEN SILO IS 20 FT. WIDE

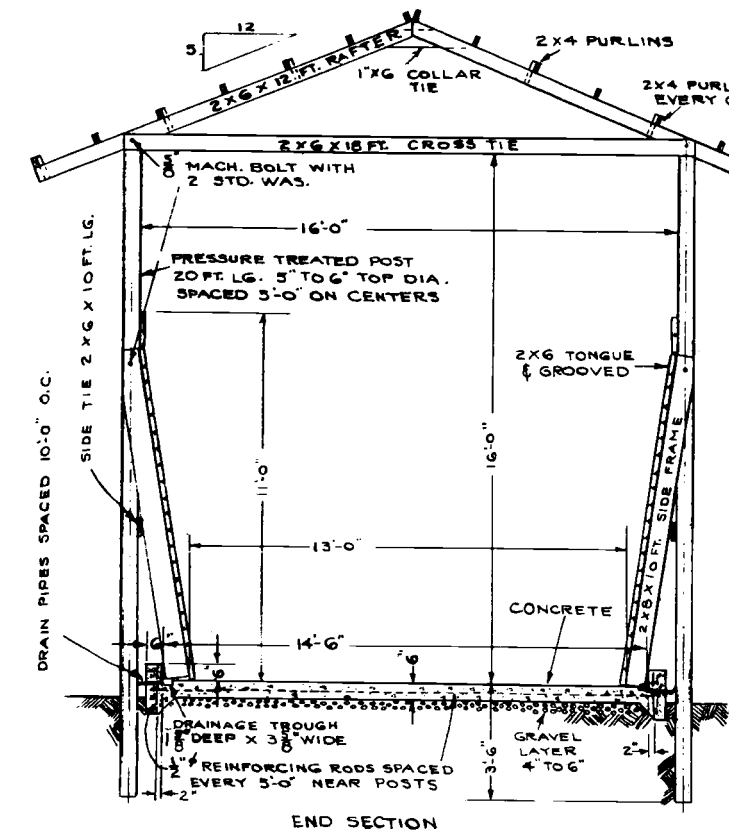
SCALE 12" 6" 0" 1' 2' 3'

FOR ASPHALT ROOFING, SHEATHING IS APPLIED UP AND DOWN ON PURLINS. FOR GALVANIZED SHEET STEEL ROOFING APPLY DIRECTLY ON PURLINS.



ISOMETRIC VIEW

SCALE 12" 6" 0" 1' 2' 3'



END SECTION

QNT.	MATERIAL LIST FOR 10 FT. SECTION 16 FT. WIDE	FBM
4	POSTS, TREATED 20 FT. LG.	
2	TIE, CROSS 2 X 6 X 18 FT. LG.	36
4	RAFTERS 2 X 6 X 12 FT. LG.	48
14	PURLINS 2 X 4 X 12 FT. LG.	102
2	TIE, COLLAR 1 X 6 X 4 FT. LG.	4
2	TIE, SIDE 2 X 6 X 10 FT. LG.	10
4	FRAMES, SIDE 2 X 8 X 10 FT. LG.	26⅔
14	TIE, PURLIN 2 X 4 X 10 IN. LG.	8
220	SQ. FT. SIDES, 2 X 6 TONGUE & GROOVED	
240	SQ. FT. ROOF, 1" TONGUE & GROOVED SHEATHING	
240	SQ. FT. ROOFING (AS SELECTED)	
10 FT.	RIDGE SECTION	
4	BOLTS, MACH. 5/8" X 10" OR 11" LG. WITH 2 STD. WAS.	
4	BOLTS, MACH. 5/8" X 8" OR 9" LG. WITH 2 STD. WAS.	
36 FT.	ROD, REINFORCING ½" ø	
2	PIPES, DRAIN 1" STD. PIPE X 1-FT. LG.	
88	CU. FT. CONCRETE, FOR FLOOR	
	MATERIAL REQD. FOR END	
4	POSTS, TREATED 20 FT. LG.	
1	TIE, CROSS 2 X 6 X 18 FT. LG.	18
2	RAFTERS, 2 X 6 X 12 FT. LG.	24
1	TIE, COLLAR 1 X 6 X 4 FT. LG.	2
1	TIE, SIDE 2 X 6 X 18 FT. LG.	18
4	FRAMES, SIDE 2 X 8 X 10 FT. LG.	26⅔
170	SQ. FT. SIDES, 2 X 6 TONGUE & GROOVED	
4	BOLTS, MACH. 5/8" X 10" OR 11" LG. WITH 2 STD. WAS.	
4	BOLTS, MACH. 5/8" X 8" OR 9" LG. WITH 2 STD. WAS.	
2	PIPES, DRAIN 1" STD. PIPE X 1-FT. LG.	
16	CU. FT. CONCRETE, FOR CURB & SKIRT	
7	TIE, PURLIN 2 X 4 X 10 IN. LG.	4

POLE FRAME SILO