GEORGIA COASTAL PLAIN EXPERIMENT STATION
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Information based on results of practical experiments in
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BRIGHT LEAF TOBACCO CURING BARN CONSTRUCTION

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High fuel cost and need for control of the curing conditions in the barn to secure a high quality cured leaf emphasize the importance of proper barn construction. A barn built according to the following plans, if managed properly during the curing, will give very satisfactory results with an appreciable saving in fuel. This size barn has a curing capacity for about four acres of average tobacco. It is well adapted to the farm tobacco acreages grown in Georgia and it can be filled in one day by a labor force requiring two stringers.

A barn built according to this plan must be operated somewhat differently from the usual loosely constructed barn which may be closed as tightly as possible during the yellowing period in an effort to maintain high humidity conditions. It will be necessary, as with any other barn, to keep ventilation adjusted to secure the proper rate of yellowing and drying. It is advisable to provide ventilation to this type barn from the beginning of the cure since it is more tightly built than most barns in general use. However, care should be taken in ventilating to avoid excessive drying during the yellowing period. Excessive drying at this stage may result in premature setting of objectionable greenish color in the tobacco.

Construction Details

It is desirable that all framing lumber be dressed. If not dressed on all sides, it should, at least, be sized.

Foundation

The foundation wall is made of three courses of 8" x 8" x 16" concrete blocks and one course of 4" x 8" x 16" blocks resting on a concrete footing 8" thick and 14" wide. In some instances, more courses of blocks will be necessary since the footing should be on firm, undisturbed earth. The course of 4" x 8" x 16" blocks should be laid between the two top courses of the large blocks and with the cells horizontal. This row of openings around the barn provides the bottom ventilation. It is realized

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1. The recommendations contained herein are based on cooperative research studies conducted by the Coastal Plain Experiment Station, College of Agriculture, University of Georgia, and the Bureau of Plant Industry Soils and Agricultural Engineering, U.S.D.A.

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that this will provide too much ventilation if left completely open, but it is an effective system if closed to the desired amount by wads of mineral wool insulation or other material that will permit a seepage of air to enter the barn.

In the foundation wall, a section of drain tile placed on the low side will be worthwhile in preventing excess moisture in the floor of the barn. A fill of about 8 inches consisting of sand on cinders or gravel will provide a drier floor and will be especially worthwhile if a coal stoker is installed as the heating unit. This space will allow sufficient room for the stoker to be placed on ground level and not in a hole as is so often done through necessity.

Framing

Sills: The sill should be made of doubled 2" x 6"'s secured to the foundation by anchor bolts set in the wall in concrete.

Studding: Two sizes of studding are recommended in the wall construction. A 4" x 4" (two 2" x 4"'s) studding is placed at each corner, at each tier pole location and alternately across the other two sides of the barn. This size studding gives added strength to the wall and the stud thickness (4 inches) is the proper spacing between the pairs of 1" x 6" boards recommended for tier poles. Between each of these double stud members, a single 2" x 4" studding is placed.

The space between studding is slightly over two feet if dressed material is used. If the barn is insulated, as is recommended, material with a width of two feet will fit between the studding very nicely.

Plate: The plate is made by doubled 2" x 4"'s, with joints staggered.

Rafter: Since the rafters support some of the weight of tobacco, 2" x 6" material should be used.

Siding

Wall sheathing should be applied diagonally. Material for this should be dressed on all four sides; if not, it should by all means be sized to a uniform thickness. It is recommended that it be angled in only one direction on each side of the barn. This prevents a joint with resultant vertical weakness through each side of the barn. The sheathing should be applied so as to brace against the prevailing wind, which is from the southwest in Georgia.

A 15-pound builder's felt should be placed over the diagonal sheathing. The outside of galvanized or aluminum roofing material placed vertically provides an exterior wall surface that will be easier to apply and have a lower maintenance cost than painted wood siding. Other siding materials that will offer equivalent protection from weather and wall tightness are satisfactory.

If insulation is not used in the wall construction, wood siding is recommended since it will provide a wall with higher resistance to heat transfer than the metal
siding.

Roof

Close sheathing, laid at right angles to rafters, covered with 15-pound builder's felt and slate surface shingles is recommended for the roof. In all cases, the sheathing should be of dressed material. Metal roofing can be used satisfactorily if the barn is close sheathed. However, felt should be applied under the metal. The practice of putting metal on open purlins is known to be inadequate and is not recommended. It is recommended that in existing barns having roofs with exposed metal inside, the exposed metal be covered, even if it is feasible to only tack paper felt under rafters or to purlins between rafters.

Doors

The door should be placed on a side wall opposite the furnace in case a flue heating system is used. Such a location will allow the barn attendant to enter the barn during the cure and check the condition of the tobacco over a large area without crossing the hot flues. It will also help in filling and unloading the barn. A door of sufficient size to allow a man to walk through without stooping is desirable.

Inspection doors are recommended in the top gable ends of the barn. These also provide more openings at the top when ordering the tobacco preparatory to its removal from the barn.

Ventilators

The bottom ventilation has been explained along with the instructions for the foundation walls. A top ventilation system that can be controlled is recommended. One that cannot be closed causes a complete lack of control in the barn when it is desired to adjust conditions during the curing process. Fuel is also wasted by a lack of ventilator control. The style ventilator shown which was developed at the Oxford, North Carolina Tobacco Experiment Station is recommended. The flat top reduces the chance of a down draft in comparison with some of other types.

The doors of the ventilator are opened and closed by rods that extend down through the barn. The operator adjusts these while standing on the floor. The doors are held in the desired position by placing a pin through a hole in the rod and resting on top edge of bottom tier pole. The rod is passed down through the two boards that form a tier pole and are held in position by spacer blocks.

Tier Poles

Tier poles, except the ones against the side walls, are made of two 1" x 6" boards. They are spaced the thickness of the large studding (four inches) apart. Less interference is encountered from sticks being hung in the adjacent rooms than when both sticks are hung on a tier pole made of only one piece of material. A 2" x 4" support is run vertically through each set of tier poles. This support does not extend below the bottom tier pole. Horizontal bracing is also necessary.
for added strength.

If the tier poles are run perpendicular to the wall through which the door is placed, the center pole on the bottom must be cut off several feet away from the door, otherwise it would extend into the door opening. The free end should be supported by a 2" x 4" member nailed to the tier above.

Insulation

Insulation improves the heat distribution, eliminates some of the cold corner conditions often found in barns, offers a tighter wall, and is a saving of curing time and fuel. Mineral wool in bats 3 5/8" thick and 24 inches wide works out well. The insulation should be held against the wall by poultry wire which is stretched across and fastened to the face of the studding. Insulation of other types with equivalent insulating value is satisfactory. Other methods of installation can be satisfactorily followed.

If the roof is built as has been explained, additional overhead insulation is not believed to be of much value.

Shed

The shed can be built around the barn as desired. In all cases, a shed should be provided when some part of the heating unit is on the outside of the barn. Material for the shed is not included in the bill of materials.
BILL OF MATERIALS
18' x 18' TOBACCO BARN

FOOTING

60 cu. ft. 1:2 3/4:4 concrete mix
11 sacks cement
31 cu. ft. fine aggregate (sand)
45 cu. ft. coarse aggregate (stone)

FOUNDATION WALL

165 8" x 8" x 16" concrete blocks
55 4" x 8" x 16" concrete blocks
3 sacks mortar cement
8 cu. ft. sand

FRAMING

Sills 12 pcs. 2" x 6" 12' long
Studding 48 pcs. 2" x 4" 14' long
Plates 12 pcs. 2" x 4" 12' long
Rafters 18 pcs. 2" x 6" 12' long

SHEATHING 2000 Bd. ft. 1" x random width

SIDING 5-v or corrugated galvanized metal or aluminum
36 pieces 8' x 26"
46 pieces 7' x 26"
or 1500 Bd. ft. wood siding

TIER POLES

48 pieces 1" x 6" 18' long
8 pieces 1" x 6" 14' long

MISCELLANEOUS LUMBER:

Tier pole supports, ventilator braces, cripple rafters, etc.
32 pieces 2" x 4" 12' long
Ventilators
1 piece 3/8" plywood 4' x 8'
Headers, etc.
2 pieces 2" x 8" 10' long
3 pieces 2" x 6" 12' long

ROOFING 5 squares

Ventilator-1 roll slate surface roofing

FELT 2000 sq. ft.
INSULATION 925 sq. ft.
POULTRY WIRE 1000 sq. ft.

MISCELLANEOUS: Nails, bolts, hinges, etc.
Paint (10 gallons outside paint if wood siding is used.)