ADAPTATION OF TOBACCO BARN FOR GENERAL CROP DRYING

James L. Shepherd and Charles E. Rice

For several years bright leaf tobacco curing barns at this station have been used successfully for drying crops in addition to tobacco. Other crops dried were peanuts, corn, lupine, cotton seed, hay, millet, and velvet beans.

Adapting the conventional tobacco barn for general purpose drying involves rather simple and comparatively inexpensive adjustments to the barn facilities. Barns which were put to this additional usage were equipped with coal stoker heating systems with automatic thermostatic controls. Other types of heating systems may be satisfactory if special adjustments are made to the burners.

The simplest crop drying system is provided by using the tobacco barn as a heat chamber from which heated air is drawn and forced through the product in a drying wagon trailer. For this a special crop drying fan is installed in a wall of the barn at a height which will approximately match the level of the bed of the trailer. The fan housing on the outside of the barn is equipped with a heavy duck canvas tunnel of sufficient length for attaching to the air chamber of the trailer.

A common size wagon trailer which is built for crop drying has body dimensions of approximately 7 feet by 14 feet with 5-foot airtight side panels. The floor is of perforated metal. Perforations are of size to hold the smallest product to be dried in the trailer, and the total openings should be from 7 to 15 percent of the floor space. The trailer bed is constructed with an air chamber beneath the floor with inlet on either the rear end or side for convenience in attaching to the fan unit. A side inlet may be preferred inasmuch as it eliminates troublesome backing of the trailer into position.

A simple insulated door is hinged to the fan opening on the inside of the barn for closing off the fan when curing tobacco. Another desirable practice is to seal the heat flux joint connections by applying a high temperature cement and then wrapping with asbestos tape or stripping. This prevents leakage of excess smoke into the barn, thereby permitting the drying air to be clean. It is necessary that adequate ventilation area be provided in the barn. It is

/1 Developed cooperatively by the Georgia Coastal Plain Experiment Station of The University of Georgia and the Bureau of Plant Industry, Soils and Agricultural Engineering, U.S.D.A.

/2 Agricultural Engineers, Georgia Coastal Plain Experiment Station, Tifton, Georgia.
desirable that when the fan is operating there is open ventilation area in the top of the barn. This area should be at least equal to the area of the fan opening. Also, it may be advantageous to provide a small amount of ventilation in the base of the barn.

For crop drying with a tobacco barn at the station the equipment included a coal stoker with a maximum feeding capacity of 60 pounds of coal per hour; a 32-inch propeller-type fan driven by 1/2 horsepower, 220-Volt, electric motor; and the wagon trailer with approximately 100 square feet of floor area. The fan carried a manufacturer's rating to deliver 6300 cubic feet of air per minute against 1 inch of water back pressure. This combination of equipment gave very satisfactory results. However, smaller heat supply and fan capacities will give good results, provided additional drying time can be tolerated.

The attached sketches provide typical details for installing drying fans in tobacco barns.

It is recommended that a suitable shed be provided to protect the drying equipment on the outside of the barn. If not, a tarpaulin may be necessary to protect the product being dried from rain.

It must be understood that the common types of attic fans with fractional horsepower motors are not satisfactory for crop drying. Special fan and motor units are available from commercial sources in a wide range of capacities for all crop drying needs. This station will furnish upon request specific sources of fans suitable for crop drying.

A drying unit of this type is very economical to establish and operate. Initial costs of equipment, not including tobacco barn and the drying trailer, should not exceed approximately $500.00. Operating costs have been found to be very reasonable. For example, peanuts have been dried for an average of less than forty cents per ton for each percent of moisture removed.

It is important that safe drying air temperatures not be exceeded. Allowable drying temperature will vary with different crops. It has been found at this station that temperatures not exceeding 100 degrees F. are safe for all crops listed above.

An added attraction to the farmer who produces bright leaf tobacco is the luxury of the fan when filling the barn with tobacco.
OUTSIDE VIEW OF FAN MOUNTED IN WALL
Typical sectional detail of installation of drying fan in tobacco barn wall.

Scale: 1 1/2" = 1' - 0"

Barn wall studding

Framing for rough opening

Door latch

4" x 4" angle iron mounting bracket

Extension to fan box of 1" x 10" lumber

Iron mounting bracket for fan unit

1/4" x 3/4" sponge rubber weatherstripping

Finish opening dimension to fit particular fan to be used

Hinged door insulated on back. Fastened in open position when fan running. Closed and latched when curing tobacco.

Barn sill

Air vents in foundation

Plug for fan box when canvas removed to protect fan against rain.

Heavy canvas duct to trailer. Draw string of sash cord holds canvas on box. Same at trailer end of canvas.