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Plastic Curtain Wall Use for Barn Venting

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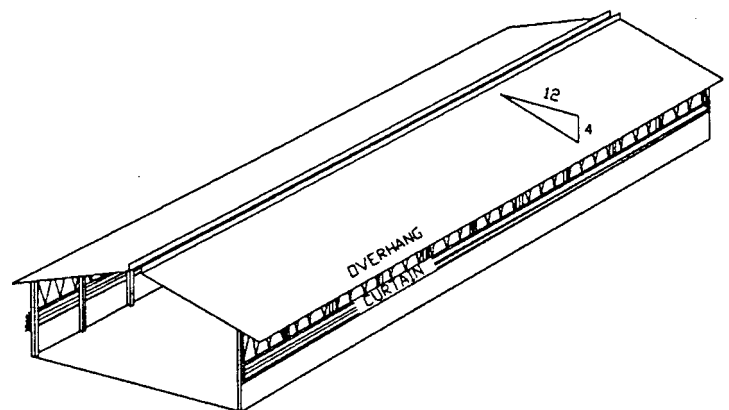
Barn ventilation systems using gravity (natural) airflow that enters through wall openings and goes out top ridge vents have been used a long time in swine, dairy, beef, and poultry barns (Figure 1). A comparatively new development is to use a plastic curtain, adjustable up and down, for the full height and length of each wall, particularly in dairy barns. This ventilation system is being adapted in northern states after many years use in poultry barns in the southeastern United States.

On large barns, such natural venting can lower barn and ventilation system investment and can optimize hot weather airflow. However, curtain wall durability and inside barn conditions in subzero, windy, snowy, and rainy weather are unknown. How successful this system will be for barn venting under South Dakota climatic conditions is still a question.

Full-height curtain walls have been used on several dairy farms the past one to two winters with satisfactory experience in eastern South Dakota. More years use and some research have been recorded in Wisconsin, Michigan, New York, and nearby Ontario, Canada.

Curtain wall installation

Water, ice, and dirt buildup can be troublesome with wall curtains that roll out from the bottom up to the top of the wall (Figure 2). The "top-open-first" installation, however, reduces cold weather draft problems on nearby livestock.



A two-curtain arrangement (one up and one down) unrolling from the wall at mid-height is an alternative. Another opening between rafters at the top of walls will allow some air movement in the barn when curtains are closed.

Different qualities and weights of plastic are available. Investment ranges from about \$1 per sq. ft. and up for plastic curtain plus screening, cables, and controls. Insulated curtains, used with barns kept above freezing, allow little light to enter but are more durable than single-layer, lighter weight plastics that are either light or dark colored. Protection against ultra-vio-

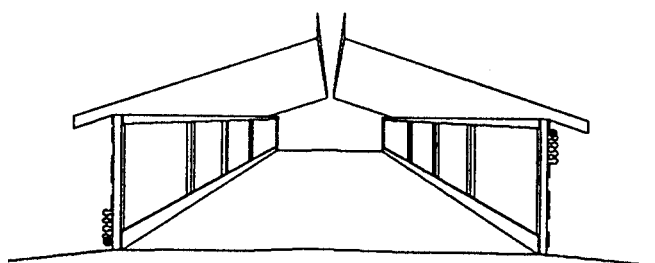


Figure 2a. Roll up to, or down from, top ???

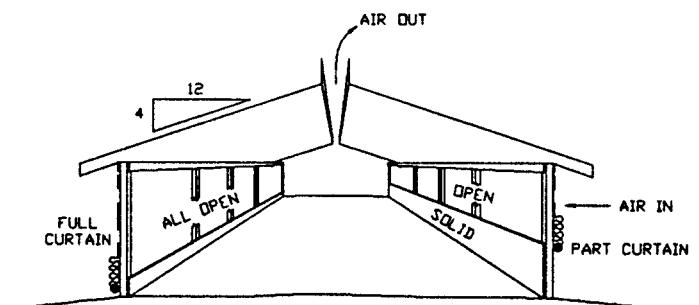


Figure 2b. Full- or part-curtain walls ???

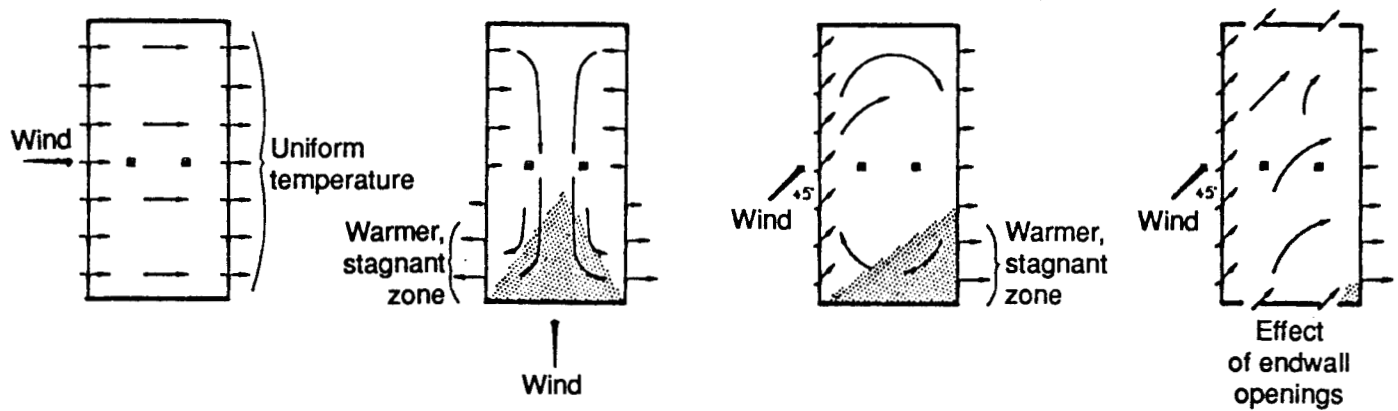


Figure 3. Wind direction effects on airflow patterns in open-wall, freestall dairy barns during summer conditions (plan view) according to Ontario, Canada experience through 1990.

let ray degradation is important. Expect a curtain life of 5 to 10 years.

Systems for pneumatic or electric, rather than manual, control/operation of curtain movement are available. Automatic control on the south side and manual control on the north side is a good combination. Metal cables do not stretch like nylon cording.

Daily operation of the wall curtain helps keep it cleaner and more flexible and discourages rodents. Rodents can be troublesome with bundled or rolled-up curtains.

Periodic maintenance is necessary.

Other construction considerations . . .

Use wire or plastic screening over the wall openings to restrict birds and livestock from reaching and chewing the plastic curtain. It also reduces flopping.

In addition to the adjustable curtains that let in fresh air along each wall on A-shaped, gable-roofed barns, a ridge opening at least 1.5 inches wide for every 10 ft. of barn width is needed for cold weather air outlet when wall openings are mostly closed. In other words, allow at least a 6-inch wide, continuous ridge opening (or equivalent area of ridge ventilators) for a 40 ft. wide barn.

A 4:12 or steeper roof slope aids air updraft as does having sufficient livestock in the barn to produce heat. Adjustable ridge vents are available and/or 12-inch high sideboards, on each side of the open ridge space, can be used to reduce cold air and snow backdraft problems at ridge vents. With wall curtains fully open in hot weather, air blows in one side and out the opposite side or end of the barn—provided high trees, buildings, hills, or other obstacles aren't in the way and barn walls are about 10 ft. high (Figure 3). Prevailing July winds in South Dakota are from the north-northwest and south-southeast. Wide, open doors in endwalls assist indoor air circulation.

To reduce rainwater drip-in and roof snowslide problems, at least an 18-inch-wide barn roof overhang or eave is suggested. Alleys along outside walls, rather than stalls or pens, reduce draft and wet bedding problems.

For more information . . .

The MWPS-33 booklet, "Natural Ventilating Systems for Livestock Housing," explains planning information for different barn gravity venting system designs. It covers nearby building spacings, use with different barn insulation systems, and includes design application examples. This booklet is available for \$5 from the Agricultural Engineering Department, South Dakota State University, Brookings, SD 57007, or from your county Extension agent.

This publication and others can be accessed electronically from the SDSU College of Agriculture & Biological Sciences publications page, which is at <http://agbiopubs.sdstate.edu/articles/ExEx1011.pdf>



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