

STABLE PLAN

A Breath of Fresh Air

BY JOHN BLACKBURN



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Roof vents and open-topped stalls allow hot, damp air to escape from a barn.

A barn's large roof surface naturally captures solar energy, heating the interior air, which accumulates at ceiling level. Cooler air is drawn in at the floor level, creating a vertical airflow path and a healthier environment for horses.

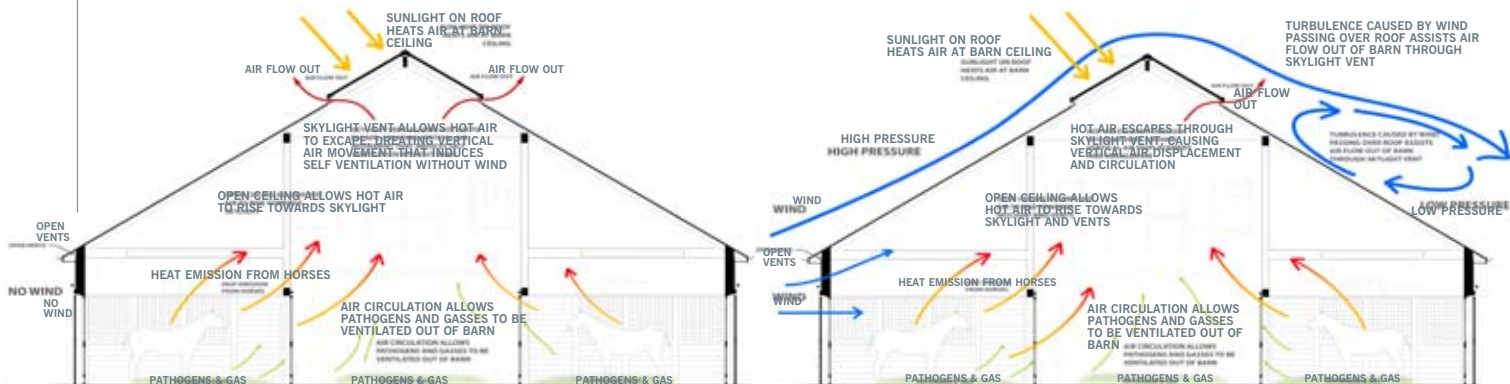


When it comes to designing a barn that'll be a healthy environment for your horses, ventilation is one of the most important considerations. Luckily, good ventilation—essential in every barn regardless of climate—doesn't require expensive equipment or energy-guzzling systems. A ventilation system that both reduces the risk of disease and benefits the environment is simple to achieve using the right design knowledge and techniques.

The goal for a healthy stable is upward ventilation. Mechanical systems, in the form of electric exhaust fans, are not only expensive to maintain and run, but they can put the safety of your barn at risk. Obviously, mechanical systems can be a fire hazard, but they also pose

danger in the way they ventilate. Exhaust fans draw air laterally across the barn, and this horizontal airflow increases the risk of passing pathogens and unhealthy gases from one stall to the next.

Upward, vertical ventilation actually helps prevent the risk of disease in horses housed in the barn by minimizing the



amount of damp, stale, contaminated air in their stables. Designs that create this ventilation harness natural solar and wind power to effortlessly provide a strong interior current and upward movement of air in the barn. The air current within a well-designed barn is strong enough to ventilate the interior, even on a still summer day.

Two factors create this energy-efficient ventilation system.

First, the large roof surface of barns and arenas captures solar energy, heating the air at the ceiling. Heat generated by the horses also rises, as long as stalls are designed with open ceilings that allow air to flow freely upward. As warm air rises and accumulates at the ceiling, cooler outside air is drawn in near the floor, creating a vertical airflow path. Proper design of vents along the barn roof permits the hot, damp air to escape, making room for cool, dry air to enter through stable openings low in the perimeter walls.

Second, the roof surface captures the natural wind flow to maximize the amount of fresh air entering the barn. Wind moving over a large, steeply sloped roof produces high pressure on the windward side of the barn, which is balanced by low pressure within the barn and on the leeward side. This *Bernoulli effect* also pushes hot air out and brings fresh air in. Placement of the barn with regard to prevailing wind patterns can maximize this effect, increasing the amount of fresh air in the barn.

Combining the power of solar energy and natural wind in a barn designed to take full advantage of both allows the structure to function as a large, air-circulating machine.

John Blackburn is an architect whose portfolio includes hundreds of equestrian projects, ranging from barns and arenas to complete training facilities. He has offices in San Francisco, California and Washington, D.C. To learn more about Blackburn's work, visit blackburnarch.com.

WISDOM

**“No better word
can be spoken of
a man than that
he is careful with
his horses.”**

—ANDY ADAMS
THE LOG OF A COWBOY