

Tube Fan Ventilation for Pre-Weaned Calf Barns

Part 4: What is needed to Design a Tube Fan System for Existing Barns?

Due to the inherent differences in calf facilities and management styles, tube fan ventilation systems are best designed individually for each barn. Multiple factors such as barn configuration, stocking density, management, and seasonal ventilation concerns must be evaluated to ensure successful function of the ventilation system. When working with a ventilation designer there is a standard list of information that the designer needs provided to complete a prudent design.

Existing Facility Details

In order for the designer to understand the existing barn, a basic floorplan of the facility should be provided (Figure 1) and include:

- Location of pens
- Pen dimensions
- Pen stocking density

- Location and size of curtain sidewalls
- Barn width, length, and eave height
- Existing fans, if any
- Location and size of openings (doors, windows, ridge vents, etc.)

It is important to clearly note existing openings. Understanding the quantity, sizing, and management of existing openings has a large impact on the design. When there are inadequate openings to allow air to escape exhaust fans will need to be included in the tube fan system. A google earth image of the farmstead with north, and the calf barn under consideration clearly identified is also a useful resource for the designer (Figure 2). Labeling other facilities in the surrounding area and identifying prevailing wind direction can help in evaluating the existing site conditions, and the direction airborne pathogens may arise.

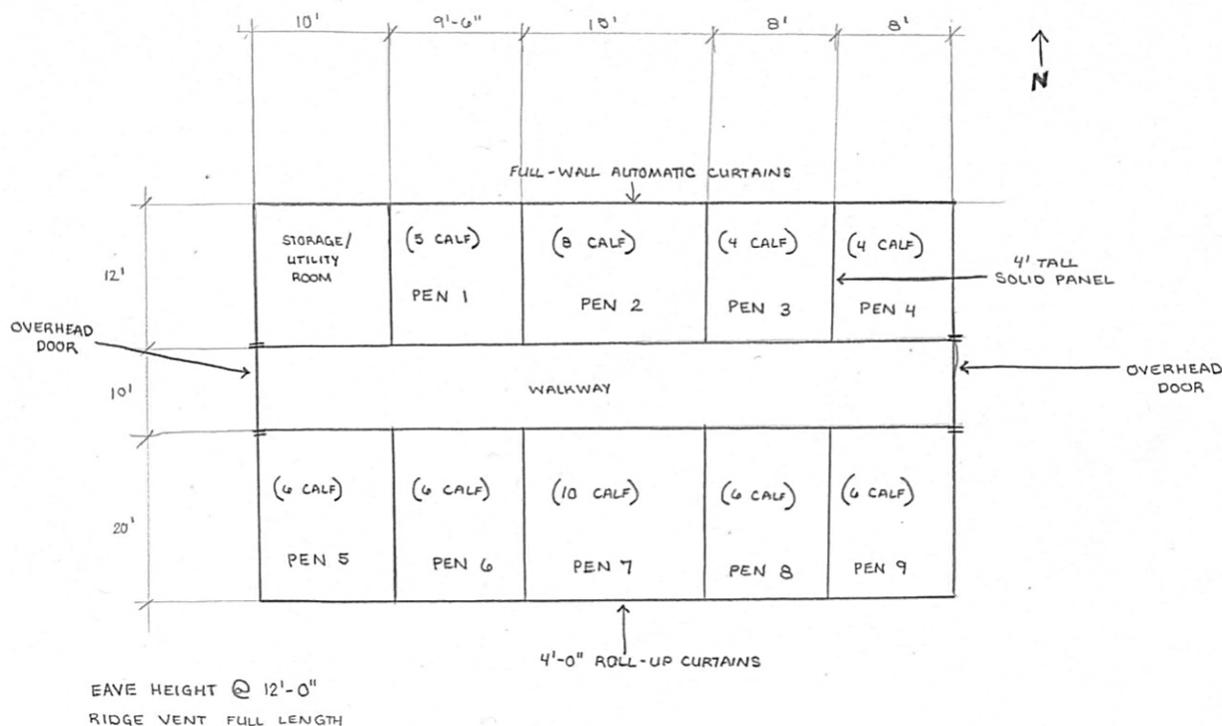


Figure 1. Sample Floorplan with all required information



Figure 2. Sample sitemap with existing calf barn located by a red circle, and north identified in the upper left-hand corner.

Images

Pictures of the barn, which are labeled in relation to the aforementioned floorplan, are helpful to creating a ventilation design. Images can be used to estimate missing dimensions, and better understand the operation of daily tasks. Be sure to include images taken outside the shelter displaying the four exterior elevations along with images taken inside the barn, showing exterior walls, available space, calf pens, and any large obstructions to airflow.

Stocking Density

System design can be dependent on the shelter’s stocking density. The number of head housed within the facility, the typical number of head kept within each pen, and if there are various age groups housed in the calf barn are needed in order to determine required air exchange rates.

Management

Calf management practices can also impact the ventilation design. First, the designer needs to be aware of any activities that take place in the barn that could impact the location of tubes. Common items that impact tube locations are sizing of equipment driven through, cleaning processes, and location of the electrical service. Management practices such as depth and type of bedding, barn cleaning frequency, use of individual pens, solid or open panels between animals, feeding frequency, and insulated ceilings can also impact ventilation capacity.

Concerns and Goals

It is important to be clear about existing conditions that are causing concern in the barn. Common concerns include condensation forming on the ceiling during the winter, overwhelming amounts of manure gas present, high environment-related mortality rates, and stale air as temperature rises. Identifying which seasons trouble the facility the most will help the designer prioritize stages of ventilation if the existing barn limitations preclude installation of all seasonal ventilation stages. With information on the priorities and concerns, most problems can be addressed and if all seasons cannot be ventilated by tube fans, possible solutions could be included.

FACT SHEET SERIES

Tube Fan Ventilation for Pre-Weaned Calf Barns

Part 1: System Overview and Practical Information

Part 2: Fan Considerations

Part 3: Tube Options Overview

Part 4: What is needed to Design a Tube Fan System for Existing Barns?

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