

## Improving Ventilation in Calf and Heifer Housing

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## Defining Terms

**Ventilation = Air Exchange**  
**= Bad Air Out & Good Air In**

**Air Circulation = Moving Air within Barn**  
**≠ Ventilation**

**Draft = ?**



## Types Of Ventilation Systems:

Natural Ventilation

Mechanical Ventilation  
Negative Pressure  
Positive Pressure

## Types Of Ventilation Systems:

### Natural Ventilation

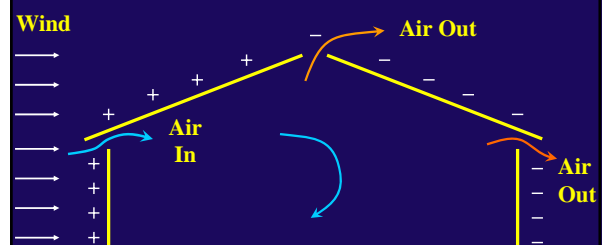
Uses forces of nature for most of ventilation  
Barns w/o Ceilings  
Open Ridge and Eaves in Winter  
Open Sidewalls in Summer  
Located to Catch Wind  
Can be Supplemented w Positive Pressure Tubes and Fans or Circulating Fans

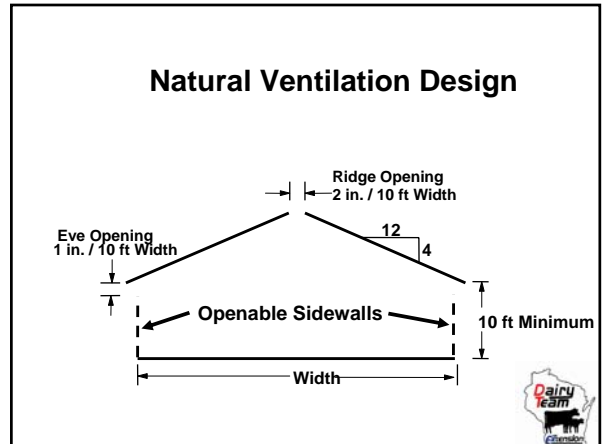
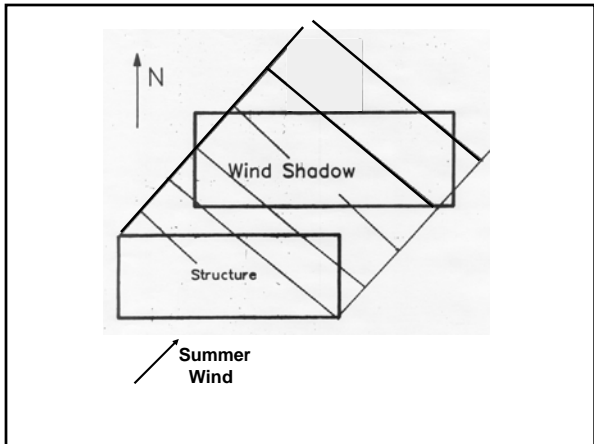
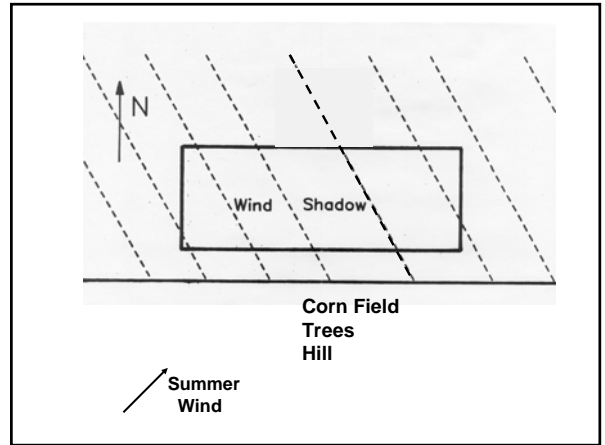
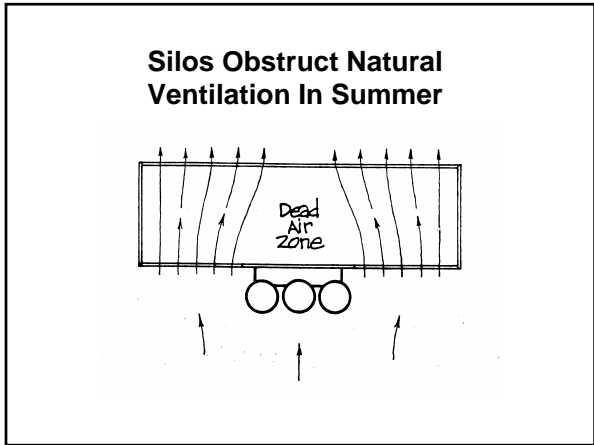
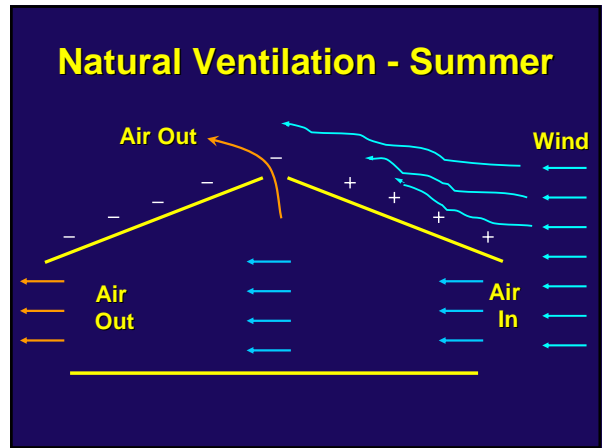
Natural ventilation uses the forces of nature to cause air exchange

**Wind is the primary force**



## Natural Ventilation - Winter





## Types Of Ventilation Systems:

### Mechanical Ventilation-Positive Pressure

- Fans Cause Air Exchange
- Fans Force Air Into Barn
- Ducts Distribute Fresh Cold/Cool Air
- Requires Outlets
- Barns w Ceilings
- Tight Construction Not Required

#### Variations:

- Adjustable Slot Inlet in Duct
- Holes in Duct-Single Flow Rate
- Fans Blow in w/o Duct in Warm Weather

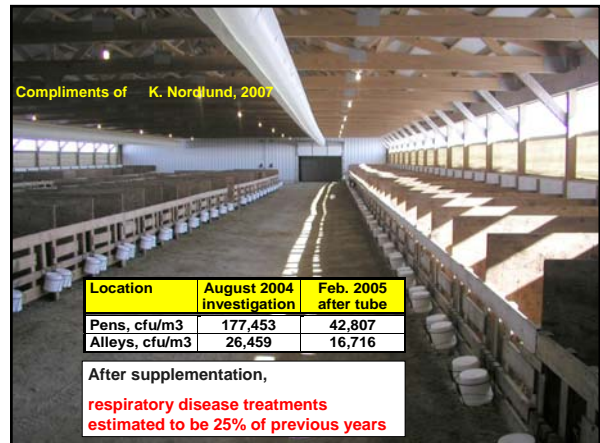
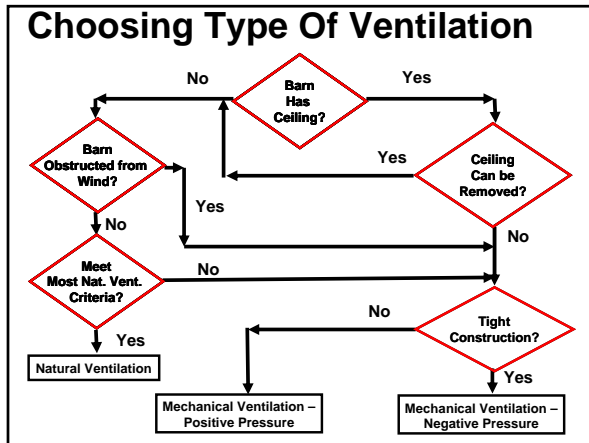
## Types Of Ventilation Systems:

### Mechanical Ventilation-Negative Pressure

- Fans & Inlets Cause Air Exchange
- Fans Exhaust from Barn
- Barns w Ceilings
- Tight Construction**
- Designed Inlets Distribute Fresh Air


#### Variations:

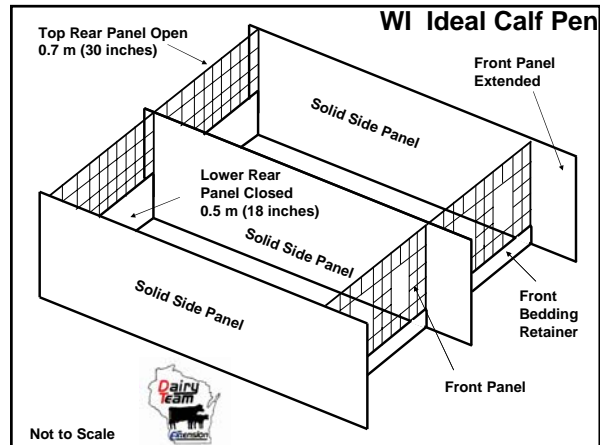
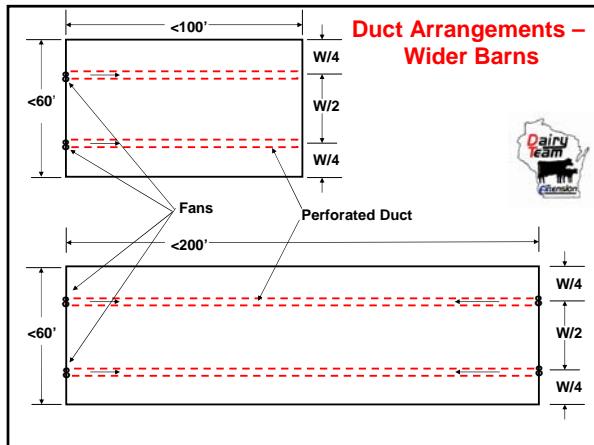
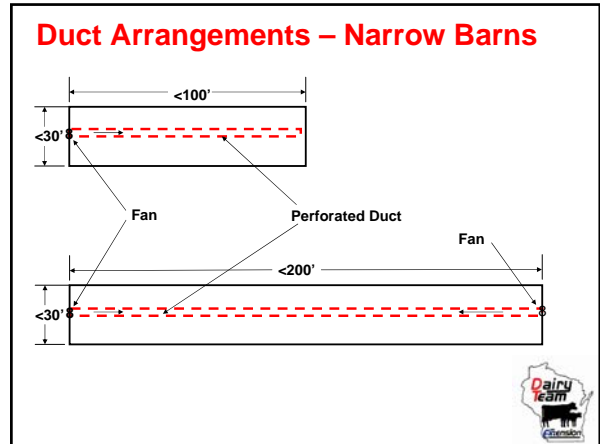
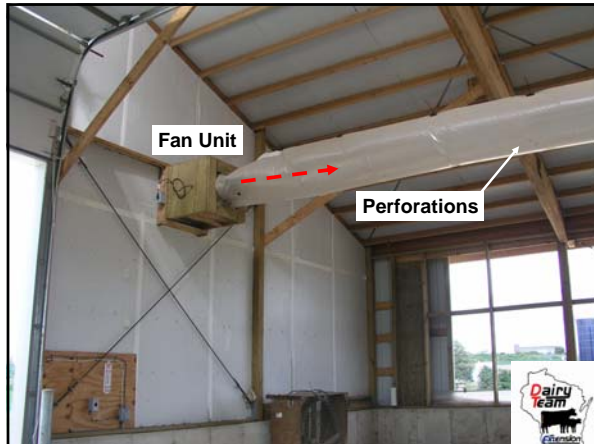
- Adjustable Slot Inlet
- Circulating Tubes
- Area Inlets
- Positive Pressure Tubes
- Wind Tunnel



**Positive Pressure Tubes = Winter Supplement Natural Ventilation to Remedy a Design Deficiency**

- Three or four sided pens
- Upwind obstructions (includes lean-to's)
- Eave inlets too small
- Ridge outlet too small or non-existent





**Cumulative Ventilation Rates for Warm Dairy Barns**

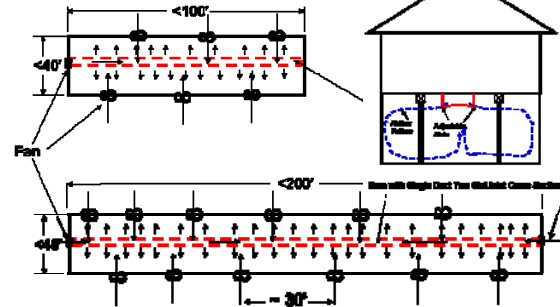
Animal Group	Cold*	Mild	Hot**
Calves (0-2 mo.)	15	50	100
Heifers			
2-12 mo.	20	60	130
12-24 mo.	30	80	180

\* 4 Air Changes/hr-Alternative Vent. Rate

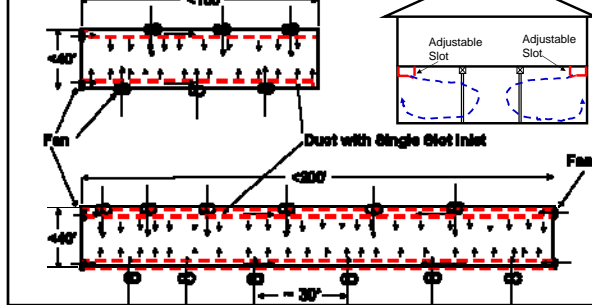
\*\* 60 Air Changes/hr -Alternative Vent. Rate

MWPS-7

**Duct Arrangements – Narrow Barns**  
**Single Duct**



**Duct Arrangements – Narrow Barns**  
**Double Duct**



**Duct Arrangements – Wide Barns**  
**Three Ducts**

