

# Key design features to consider before building a new calf barn

Jessica Getschel and Ryan Leiterman for *Progressive Dairyman*

## AT A GLANCE

Designing a calf barn can be a daunting task. So much can go wrong. Choosing the right ventilation, housing style and layout are critical to building the right barn the first time.

Proper barn planning saves time and money. For every decision, it is important to understand its associated ramifications. In calf barns, housing style and pen configuration decisions impact ventilation options, which in turn affects the overall success of the barn. Before building a calf barn, think about the ventilation requirements for every season. Allocate at least 10 percent of the overall building cost for the purchase of a well-thought-out ventilation system, and ask these three questions as you consider your ventilation options:

**1** Will the system deliver a consistent source of fresh air into the barn during all seasons?

**2** Will the system effectively control the air speed at calf level?

**3** Can the ventilation system rapidly adjust to the changing weather conditions of spring and fall

when there are warm days and cool nights?

### Housing style impacts ventilation choices

Ventilation options vary according

to the calf housing style. Group-housed and individually penned calf barns face different limitations when it comes to providing good air quality. These limitations need to be addressed while considering the three routes

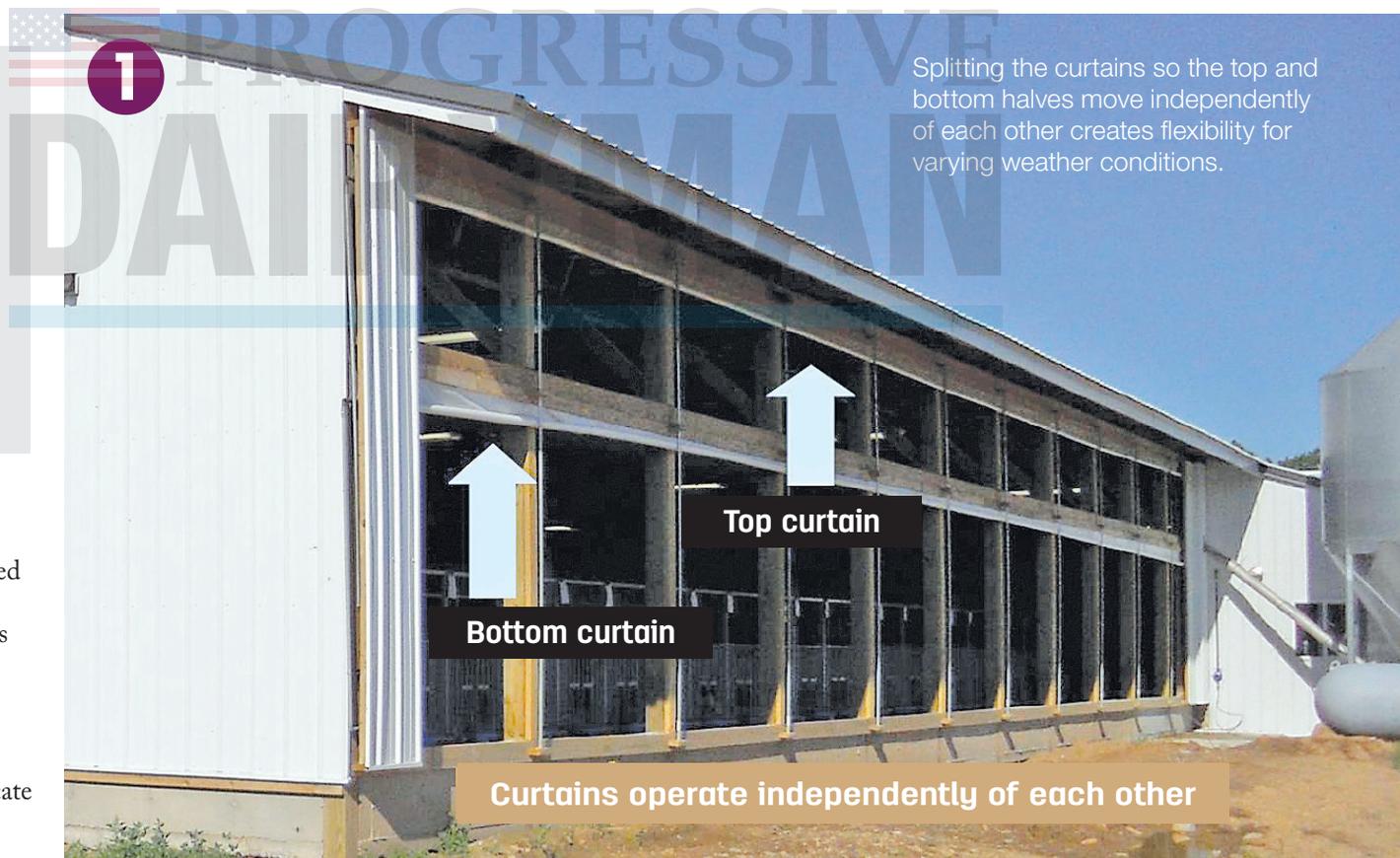
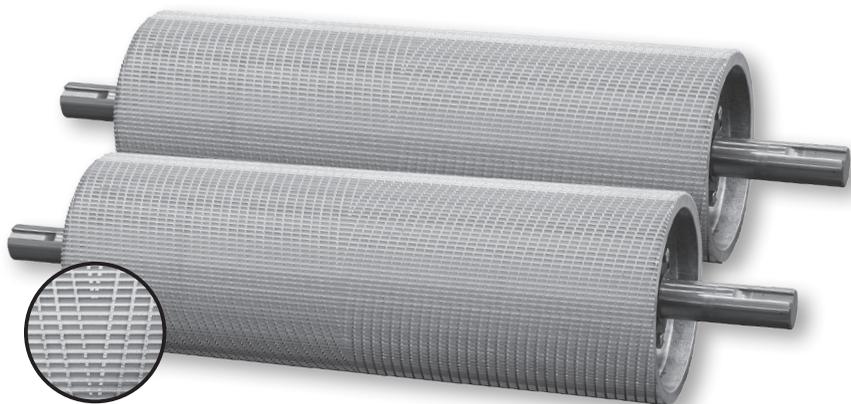


Photo courtesy of Crystal Creek.



Get the kernel process score others only dream about!

Available for all major and aftermarket brands



Benefits: Zero end strain and minimized end wear



Durable. Dependable. Quality.

**717-354-5040**  
For questions and information

## Are you on the list?

Not yet signed up for the *Progressive Dairyman* Extra newsletter? Then you're missing out on **web-exclusive** articles.



Scan this code or visit [progressivedairy.com/enews](http://progressivedairy.com/enews) to subscribe to Extra newsletters from *Progressive Dairyman*

Equipment is expensive. This *Progressive Dairyman* Extra offers tips on how to preserve the life of your equipment. From troubleshooting hydraulic hose failure to equipment operator education, knowledge found in this extra will help you prolong equipment life and save money.

### PROGRESSIVE DAIRYMAN **extra** e-newsletter



### Mechanics Corner: Protecting equipment

Written by Brad Nelson

"If they positioned the dipstick under a cow's tail on a loader, then maybe the herdsman and his helpers would check the oil."

I asked a dairyman what his pet peeve was pertaining to mechanical things at his dairy. The above quote was his first response. He went on to say that if a person can't handle gates and free stalls being mangled by loader buckets without having a meltdown, then maybe they shouldn't be in the dairy business.

Let's face it; if a person looking for a job at a dairy had the skills to operate a loader at the journeyman level, he would not be looking for work at your dairy.

[How can you increase the skill of your equipment operators?](#)

### NEWS

[Survey reveals consumer attitudes on sustainability and agriculture](#)

[NMPF asks EPA to suspend national enforcement of WOTUS rule](#)

[Fairlife gives aspiring](#)



PROGRESSIVE DAIRYMAN

advertisement



2

These 18-inch knee walls create better airflow at the level of the calves.

of ventilation: natural, mechanical or a hybrid of the two. Decades of past experience show that natural ventilation alone does not perform well without mechanical support. For that reason, most barns today are ventilated either strictly mechanically or naturally with mechanical assistance.

Group pens typically have very open spaces with little obstruction to airflow. This allows air to be delivered to the calf at their level from any direction. The concept of an open area broadens ventilation options. Fresh air can be drawn from open curtains, and panel fans can increase the speed of fresh air during warm weather to help with heat abatement. Both positive-pressure tube ventilation and tunnel ventilation can be designed to provide seasonally appropriate airflow. The key to successfully ventilating group housing is ensuring there are no solid barriers in the path between the fresh air inlet and the calves. Keep in mind that group pens pose a larger risk of contagious pneumonia spread by nose-to-nose contact. As a result, it is possible to have increased respiratory disease rates in group-housed calves, despite excellent air quality inside the pens.

Individual pens typically have solid sidewalls which obstruct airflow at the calf level. Air must be directed into the pen from above the calf or through the back of the pen if an open material such as a cattle panel is used. When designing a ventilation system for individual pens, it is important to recognize that the air quality above and around the pens does not accurately reflect the air quality of the

calf's immediate pen space. It is quite challenging to direct fresh air into the calf's small, obstructed area and as a result, many ventilation systems today do not provide individual pens with the necessary air volume changes. Tunnel ventilation systems may deliver fresh air to the barn, but may not effectively deliver fresh air to the calf level. Similarly, panel fans move air over the top of pens but do not effectively deliver fresh air at the calf level. Positive-pressure tube ventilation is arguably the best way to ventilate individual pens, as the tubes can uniformly distribute fresh air down the length of the barn and direct it straight into the pens. Since the fresh air comes from directly above, the solid walls of the pen no longer pose obstacles. With individual pens, the layout should be designed to start 2 to 3 feet from the outside walls. This arrangement will help prevent drafts from the sidewall curtains, facilitate bedding delivery and avoid straw contamination of the milk and grain buckets.

Whether or not sidewall curtains will benefit your ventilation plan is another option to consider when designing a calf barn. Sidewall curtains offer a great way to naturally ventilate calf barns, with many different arrangements to consider from the height of where the curtain starts to the direction which it rolls. Rolling curtains from the bottom up allows fresh air to enter at the calf level. It can also keep natural gusts of air from interrupting air streams directed out of positive-pressure tubes.

Continued on page 54

# Smart Cow Brush

Spring cleaning?

Don't forget your cows.



Highly Recommended by Veterinarians

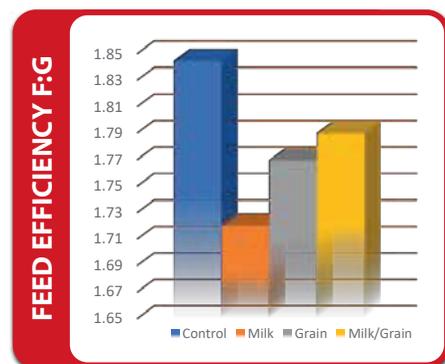
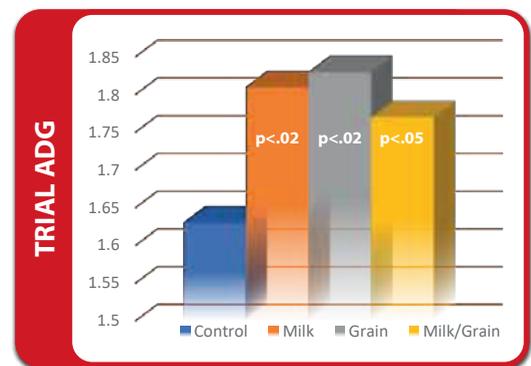
J&D Manufacturing

1-800-998-2398  
www.jdmfg.com

## 1-G CALF 10-G MICRO

DIRECT-FED MICROBIAL EFFECTS ON HOLSTEIN HEIFER CALF PERFORMANCE

Life Products® Direct-Fed Microbial significantly improved Average Daily Gains over controls of **8.5%** to **12.2%** and improved Feed Efficiencies of **2.2%** to **6.9%**.

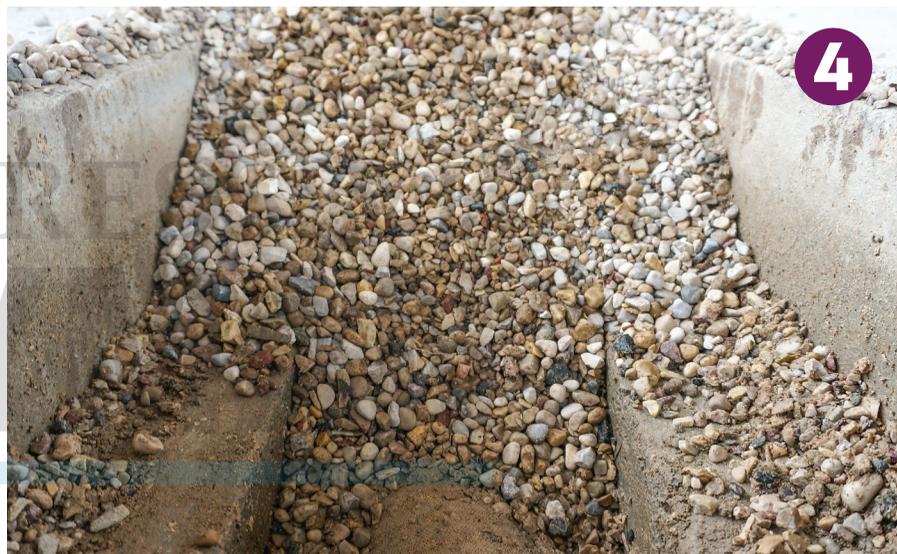


Promoting a healthier, more RESILIENT & EFFICIENT animal from birth on into the production years

Ensure You are Investing Your Money on Bacteria that will Reach the Digestive Tract Alive

Contact your local Animal Health Supplier or call **1.800.658.3120** for more information.

Photos courtesy of Dairyland Initiative.



**TOP LEFT:** Placing a drain under the bed space of the calves has been shown to help keep bedding dry. **TOP RIGHT:** Aggressive concrete slopes rapidly move liquid waste to a centrally located drain tile.

**Key design features to consider before building a new calf barn, cont'd from page 53**

Imagine in the spring or fall, when top-down curtains are open at the top for some extra fresh air. Unfortunately, the air coming through the cracked curtain will flow high above calf level and will likely disrupt the streams of fresh air coming out of the positive-pressure tube. This scenario not only fails to provide fresh air at the calf level, it also limits the effectiveness of the assisting mechanical ventilation.

Splitting the curtains so that the top half and bottom half move independently of each other is the ideal option (Picture 1, page 52). This creates more flexibility with adjusting

curtains according to varying weather conditions.

In addition to determining the height and direction of the roll of the sidewall curtain, the height of the concrete knee wall must also be determined. Historically, naturally ventilated barn blueprints required 4-foot-tall concrete knee walls, upon which fabric curtains were installed. Tall knee walls interfere significantly with natural ventilation because they create a wind shadow that leaves large, stagnant air spots around the perimeter of the building.

Lower concrete knee walls (1 to

2 feet) save concrete cost and provide better airflow at the level of the calf when curtains are open during warm weather (Picture 2, page 53). Bedding type and frequency of cleanout need to be considered when determining concrete knee wall height. The height of the knee wall must be tall enough that bedding does not build up over the height of the wall or spill over to the outside when cleaning out pens.

**Floor plan layout**

Besides ventilation and housing style considerations, the floor plan layout needs to address issues such

as drainage and feed delivery. When considering a new facility, under-the-bed drainage is often used. A pre-weaned calf will generate roughly 1 gallon of liquid waste every day. Placing a drain under the bed space of the calves has been shown to help keep bedding dry and make a more comfortable calf environment (Picture 3). This concept applies to both bedded pack and individual pen barns. Aggressive concrete slopes of 1 inch per foot are used to rapidly move liquid wastes to a centrally located concrete trench that contains a drain tile covered by pea gravel and

**“ ... for our fresh cows, especially 2-year-olds.”**

— Tom Kestell



“We use Udder Comfort™ for our fresh cows, especially 2-year-olds. We don’t have much mastitis or extreme edema. We use this product on fresh udders to speed up circulation and bring out any swelling they might have. I also like rubbing it on hocks. We have good success with this,” says Tom Kestell, 2017 NDS Distinguished Dairy Breeder.

Happy and healthy cows are the focus of the dairy Tom and Gin Kestell started in 1971. Evergreen View Farm, Waldo, Wis. is home to 130 cows with RHA 45,000M 1710F 1397P, and 2008-15 World Record Cow Ever-Green-View My 1326-ET. Her 72,147-lb record was surpassed Jan. 2017 by daughter Ever-Green-View My Gold-ET with 77,477M.

Thousands visit the farm and genetics have gone to 30 countries. Tom loves everything about dairying and balances high genomics with his focus on type and production. “Where it is needed, Udder Comfort really works. It has been a good product for us,” he says.

**UDDER COMFORT™**  
Quality Udders Make Quality Milk

**Keep the milk in the system**

1.888.773.7153 1.613.652.9086  
uddercomfort.com

Call to locate a distributor near you.



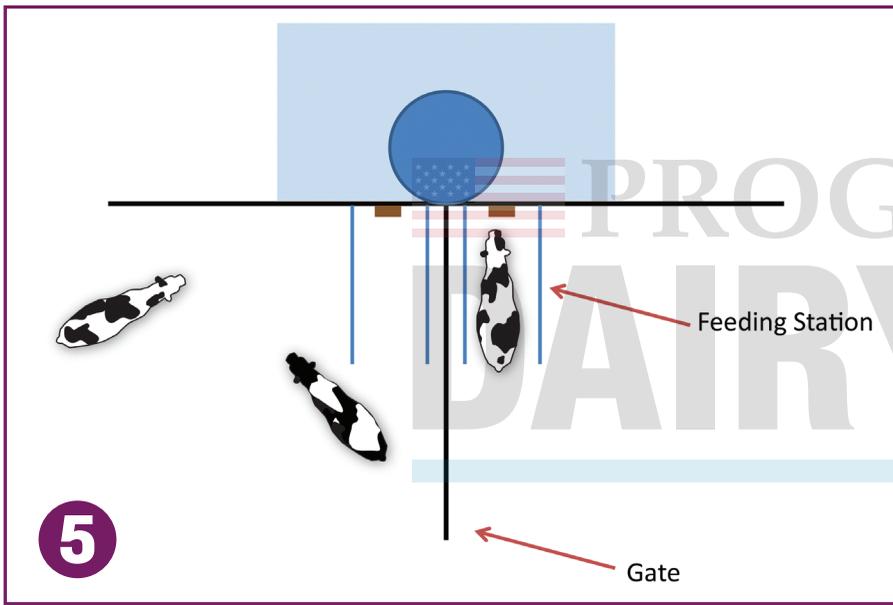
For external application to the udder only after milking, as an essential component of udder management. Always wash and dry teats thoroughly before milking.

**TOM AND GIN KESTELL**  
EVERGREEN-VIEW FARMS  
Waldo, Wisconsin

130 registered Holsteins  
BAA 111.4 (52 EX, 71 VG)  
RHA 45,000M 1710F 1397P  
SCC 100,000

2016 Holstein milk production records in 6 of 8 age divisions

2017 National Dairy Shrine Distinguished Dairy Cattle Breeder



Locating the feeding station along a wall or gate eliminates access from that side, leaving only one side available to approach the station.



Locating the feeding station in the middle of a pen, away from gates or obstructions, will allow access from all sides and improve access for timid calves.

2-inch rock (Picture 4). The drain tile removes the liquid waste from the barn and moves it to a holding tank. Visit the Dairyland Initiative website (<https://thedairylandinitiative.vetmed.wisc.edu>) for information on the most current building ideas and techniques.

In an open housing situation, automatic calf feeders are most commonly used. Competition at the feedbunk is a common occurrence in adult cow housing and as an industry, we take steps to minimize its negative effects. Likewise, feedbunk competition in group-housed calves can negatively affect their performance. The auto-feeder nipples on automatic calf feeders are small, discrete points that must be shared by a number of calves, further exacerbating the competition. It is extremely important that feeding points are easily accessible to increase the chances that smaller, or less aggressive, calves feel comfortable approaching the feeding station.

How the feeding station is placed within the pen can make a dramatic impact on its accessibility. Locating the feeding station along a wall or gate eliminates access from that side, leaving only one side available to approach the station. This configuration will limit access

for timid calves (Picture 5). Locate the feeding station in the middle of a pen, away from gates or obstructions. This will allow access from all sides and improve access for timid calves (Picture 6).

With proper planning, the investment of building a new calf barn can pave the way for years to come with sizeable returns in calf health, performance and eventually, milk production. Air quality and calf comfort are critical factors that can influence the success of any calf barn. Seek out professional industry consultants to help you plan your barn before pouring the concrete. Your calves, and your checkbook, will thank you. 🐄

*Ryan Leiterman is director of technical services with Crystal Creek. He can be reached at [drryan@crystalcreeknatural.com](mailto:drryan@crystalcreeknatural.com)*



**Jessica Getschel**  
Livestock Nutritionist  
Crystal Creek  
[jessica@crystalcreeknatural.com](mailto:jessica@crystalcreeknatural.com)

**ORIGINAL GREENFREESTALL®** By **TAGS 4 ALL GLOBAL INC.**

**"COW-COMFORT"**

If the neckrail doesn't float it's not the original GREENFREESTALL®

"The floating neck rail suits my entire herd, big and small. The stalls are cleaner. Laying time has increased, especially for the larger cows!"  
—Haete Marks

**Floating Neckrail also available for Steel Stalls**

**Dual Rail**  
Design Patents and Industrial Designs Obtained

Call today to learn more:  
**1-855-354-7687 • 519-348-9884**  
P.O. Box 1149, 109 St. Andrew St. • Mitchell, Ontario, Canada NOK 1N0  
**www.greenfreestall.com**

**BOOMERANG® DAIRY SAND BEDDING SYSTEM**  
A Div. of Sandmiser Inc. Jesse Martin, Stevens, PA

**Save Your Sand • Clean Happy Cows!**

Patents Applied For. Made in North America

**www.boomerangdairysandbedding.com**  
1-844-348-0957 • [sales@boomerangdairysandbedding.com](mailto:sales@boomerangdairysandbedding.com)  
Call for your local dealer

**ORIGINAL GREENFREESTALL®** By **TAGS 4 ALL GLOBAL INC.**

proudly introduces **FEED4ALL®**

• Allows more head movement for cows, causing less injuries  
• Floats with cow allowing her to access feed  
• New design allows cow to fully access feed with the 75° bracket, while maintaining a strong barrier  
• Cow friendly

Design Patents and Industrial Designs Obtained

Call today to learn more:  
**1-855-354-7687 • 519-348-9884**  
P.O. Box 1149, 109 St. Andrew St. • Mitchell, Ontario, Canada NOK 1N0  
**www.greenfreestall.com**

**Culbac®**  
Naturally Effective Solutions

**Dairy Benefits** Easy to use "Add it to your feed!"

*Culbac® fermentation products reduce feed and medication costs by maintaining optimal balance of beneficial bacteria in the digestive system to support immune function, health and performance.*

- \*Increase milk production up to 4.3 lbs/head/day
- \*Decrease somatic cell count (SCC) by as much as 40%
- \*Increase in rumen bacterial populations to increase digestibility of fiber and protein
- \*Fewer cows in sick pen
- Increase in ROI
- Cost is pennies/day with dollar returns
- Feed from birth through lactation
- All-natural product

**Animal Products**  
TransAgra: Manufacturing products since 1960.

- Healthy Start®
- Culbac® Animal Dry
- Rumen-Bac®

\*Research: Utah State University, New Mexico State University, University of Florida, Penn State University.

**TRANSAGRA**  
INTERNATIONAL INC.  
101 Gilbert Street, PO Box 68, Storm Lake, Iowa 50588 | 800-238-6075 | [TransAgra.com](http://TransAgra.com)

**Not Probiotics, but ABIOTICS™**