

# THE RISE OF VENTILATION CONTROLLERS

by JENNIFER JACKSON

VENTILATION CONTROLLERS

The swine industry is moving to adopt big data, particularly in ventilation.

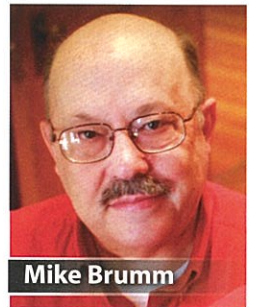
Mike Brumm, swine consultant, first realized this possibility when he participated in a ventilation workshop in the upper American Midwest about a decade ago.

"We recognized that people did not fully understand ventilation systems," he says. "Meanwhile, we also learned that we didn't know what we were doing at that time and we were supposed to be the experts."

After that realization, Brumm and his colleagues spent more time on producers' farms learning as much as they could.

"The more we visited, the better we got at being able to help producers. As teachers, (we could) simplify the expectations so that we could say 'regardless of what controller you have running your ventilation system, this is what should be happening.'"

"Controllers don't have to be fancy but, with the fancier ones, you can often do more things beyond ventilation."



Mike Brumm

## Benefits

A major advantage of the newer controllers is their ability to collect large amounts of data from sensors and electronics around the barn.

First and foremost, "these controller systems increase the data points for all data accumulated on-site and then put (the information) on the Internet," says Brumm.

"The controller is not only (managing) the ventilation, but (the controller) can also be the access point for anything that generates an electronic signal. This could be water flow (and) ammonia sensors. The controllers are now the new, (main) data point."

The ventilation controllers can send data to the producer's computer or phone, says Robert Daniel, the business development manager for

Considering the benefits of newer controller systems for pig barns.



the MAXIMUS control system.

"The MAXIMUS ties in and operates all the different equipment (such as) fans, inlets, sensors, bin scales or ESF (electronic sow feeder) systems," he says. "It will also notify personnel of all issues that may occur while the animals are in the building. All the data that's collected can be viewed locally or remotely to help management make better decisions during production."

The ability to control all these points in the barn delivers benefits, including energy efficiency, says Steve Beadle, engineer of live-stock structures and equipment at the Ontario Ministry of Agriculture, Food and Rural Affairs.

"First, the systems can control fans, heaters and inlets (for example), so some energy savings can be achieved," he says. "Elements are turned on or off as appropriate; (they) require only the 'least' amount of energy to

maintain the desired environment."

Second, the controller systems can fine-tune the pigs' environment.

"The systems can provide a more consistent environment, decreasing the magnitude of fluctuations in temperature, humidity and air quality that occur when systems are operated manually once or twice per day," says Beadle.

In Rick McBay's opinion, the biggest advantage of the newest controllers is healthier and happier

animals. McBay is the sales manager for Faromor Ltd., a company that manufactures and markets agricultural ventilation systems.

"Animal comfort is increasingly a topic of research now, such as the way farmers house the hogs or (establish) organic setups," he says. "Controller technology goes hand in hand with this trend."

A more comfortable pig results in fewer vet and medication bills, better

feed conversions and increased sow litter systems, says Daniel.

"In today's facilities, with genetics and animal welfare playing a bigger role, growers definitely need to consider systems that can notify them when animals aren't following growth curves such as feed, water or weight," says Daniel.

"If (producers) are aware of the animals' situation in real time, they can make the necessary adjustments to prevent delayed growth or sickness," he explains.

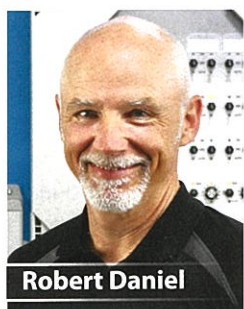
### Energy savings

A major benefit of the latest innovations in ventilation technology is the significant energy savings for the farmer, says Beadle.

"Energy savings typically come in the form of decreased electricity use and decreased heating fuel use," he says.

In terms of heating, controllers allow producers to be precise in setting temperature demands.

"Many of the automated control-



Robert Daniel

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The energy savings that farmers can achieve with the latest ventilation systems is a reason for the government to consider implementing producer incentives, says Gary Stordy.

lers will allow programming of a temperature 'curve' that changes the desired temperature set point over some period of time," he says.

"This (programming ability) can be useful in, say, the nursery when we want the temperature to be warmer at the start of this phase and to decrease (the temperature) over eight weeks, (for example), as the piglets grow."

This feature optimizes fuel use. Only the fuel that is needed is used; the producer doesn't manually change the temperature daily or every couple of days, he says.

When it comes to reducing electricity, controlled systems can turn on and off according to the environment. This action reduces the use of a fan for longer than needed, for example, in a manual system, says Beadle.

However, "in a staged system, (where additional fans turn on in sequence as the temperature rises and turn off as the temperature drops),

there can be a significant increase in electricity use if the temperature is near the stage set point (as the fans will cycle on and off fairly quickly)," he says.

"Adding variable frequency drives to the fans can help decrease these spikes in electricity use, as fans can be sped up or slowed down instead of cycling on and off."

The energy savings that farmers can achieve with the latest ventilation systems is a reason for the government to consider implementing producer incentives, says Gary Stordy, public relations manager for the Canadian Pork Council (CPC).

"The CPC is advocating for the government to

provide incentives that will allow producers to modify their ventilation systems," he says. "When you look at the cost of production and set aside the price of feed, electricity used for ventilation is a big cost. Depending on the type of system, it may be using

more energy than the new systems.

"There is certainly a federal and provincial push to lower carbon footprints. Ventilation systems are turned on and used constantly. Therefore, we should be encouraging producers to upgrade and use more efficient systems."

#### When to upgrade

Although there are many benefits to using the newest in controllers, every farm manager should determine whether the investment makes financial sense for his/her operation.

"In cases where significant maintenance is required on an existing system – if the indoor air quality, pig performance and maintenance requirements of the existing system are all acceptable – then a new installation of a similar system may be prudent," says Beadle.

"There are, however, opportunities to increase energy efficiency with new components.

"If the existing system is lacking in some way, a different system may be warranted. Measuring and document-

ing the indoor air quality, pig performance and maintenance costs (including labour) can provide some data to help farmers make rational decisions."

Alastair Bratton, production manager for Verus Animal Health Alliance, echoes the thought that producers, assisted by industry experts, should determine case by case whether they should upgrade to the latest systems.

Bratton oversees some 15,000 sows in barns ventilated with an automatic forced-air system.

The system was designed by the engineer who built the barns about 18 years ago. The system still works and there is no need to upgrade it, he says. If you want to upgrade to the newest systems, you must consider how much money you want to spend and what benefits this investment will provide.

To explain this decision-making process, Bratton uses a car analogy.

"Do you want the Bentley or do you want the basics that will just get you through?" he says.

"With ventilation, the basics will get you through, keep your pigs happy and healthy and the air quality will be good. (But consider, for example, if) you want to be notified if a fan is not working or is using more voltage (than usual) at 2 a.m., or if

your staff can notice these things every day.

"Each barn and each system is so different. You really have to understand what you need

and where your operation is situated."

Different climates require different management.

Because each operation is unique, McBey sits down and works with clients to help determine their needs.

"The first thing I do is get insight into (the farmer's) priorities. What's important for his/her farm and what's not? What's the age of the operation? What's the lifespan of the operation?



Rick McBey

What if the customer does not intend to keep the operation? Is it a brand new building?" he says.

"If (the farmer) has an existing operation (instead of a new build), we first discuss the weaknesses in the current system."

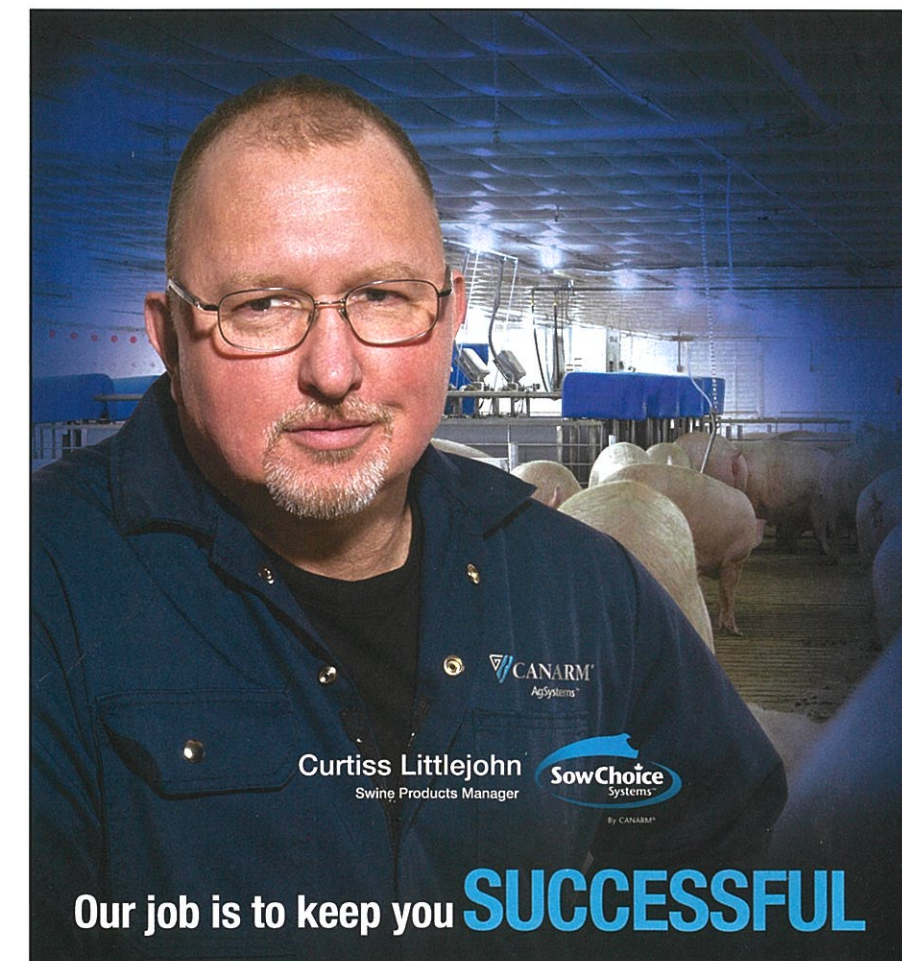
#### What to keep in mind

A factor that producers should keep in mind when deciding whether to upgrade their systems is the need to

provide adequate employee training.

Many software packages and controllers are available, so producers should acquaint themselves with the options, says Beadle.

There are different ventilation controllers – each with their own features and capabilities – on the market. Producers should understand how their system works, how to program them or whom to call to have someone program them, he says.



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Ventilation systems only work when they are maintained and calibrated, Beadle adds. A regular maintenance and calibration program should be established in every operation.

And just because the system is new and potentially more advanced does not necessarily mean it will be easier to manage, says Brumm.

"The newer systems can be very complicated, especially for staff who don't want to work with computers," he says. "You have to ask yourself: how are we going to have training sessions? What are we going to do for support if (the system) does not work today? What are the fail-safes?"

"A disadvantage is that you can change things in the barn with remote access, but you are not there to see the consequences of what you just did," he says. You could accidentally adjust the ceiling inlets, and suddenly the whole system is off.

Although the new systems may work well in your operation, you should also think of the individuals



Brumm Swine Consultancy photo

**Proper understanding of how the ventilation system works is crucial to swine operations, regardless of the age of the ventilation system, says Alastair Bratton.**

who use the system. Even if you're using the white box with two black knobs (which are often the controllers installed in conventional systems), training is important.

Bratton agrees that proper understanding of how the ventilation system works is crucial to swine operations, regardless of the age of the ventilation system.

"People often struggle to fully understand how ventilation systems work," he says. "I was recently in a barn where all the fans were running and the soffits were closed. You could hardly open the door and staff were confused as to why it was still warm in the room."

Train staff to use the ventilation system and help them understand it fully. For example, have them understand that, if they struggle to open the barn door, they have an inlet problem, he explains.

If staff are at the barn alone on a weekend, they need to know how the ventilation works to be able to adjust it accordingly, Bratton says.

## Looking ahead

Regardless of the age and type of their ventilation systems, Beadle believes producers should primarily focus on the equipment's performance.

"Producers should focus on

providing the best possible indoor air quality to maximize the potential of their pigs," he says. "Regular maintenance of both ventilation systems and other equipment/building components will ensure (equipment) longevity, proper operation and return on capital investment."

Faulty ventilation systems not only affect the pigs' performance but also jeopardize the farmer's bottom line. Beadle reminds producers to calibrate and inspect their ventilation systems regularly to ensure they maintain the desired environment.

"Poor ventilation or failing/failed systems can negatively affect anything from pig performance to disease pressure to heat/cold stress to mortality," says Beadle. "All of these issues negatively affect the bottom line. In addition, poorly operating or failed systems can affect equipment and building components and, in extreme cases, can lead to fire."

The latest in swine ventilation software and controllers indicates where the industry is headed, says Brumm.

"Big data is the future for pig barns. Think back 10 years ago when precision farming was just starting on corn and soybeans. Now everyone is used to it," he says. **BP**



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