



Poultry Ventilation Pointers →

Managing Broiler House Backup Systems to Avoid Losses

By Jim Donald, *Extension Agricultural Engineer and Professor*
Biosystems Engineering Department, Auburn University
334-844-4181, fax 334-844-3548, jdonald@acesag.auburn.edu

Modern ventilation systems require backup systems to prevent catastrophes →

Over the past several decades, vast improvements have been made in controlling the in-house environment for broiler production. Being able to keep temperature and other air quality factors more consistently within the birds' "comfort zone" has enabled growers to achieve a much higher level of performance on a year-round basis. Generally, less day to day adjustment of controls is required with environmentally controlled housing; but the need to monitor the house environment, the birds, and the desired target setting becomes an even more important daily task. Also, installation and daily management of proper backup systems are essential to prevent possible catastrophic loss. If the primary in-house environmental control system for any reason fails in one of today's modern houses, the entire flock can be put at risk unless backup systems are in place and work properly.

Thermostat-controlled power ventilation brought need for curtain drops →

There are growers still in the business who remember when ventilation control simply meant adjusting window openings. In such a simple manual-control house with low stocking density, you couldn't do a great deal for bird comfort. But if you didn't get it quite right nothing drastic was likely to happen.

Better environmental control was made possible by curtain sidewalls, along with thermostatically-controlled brooders and fans. Thermostats were generally accurate to within 2 degrees F – but only if they were protected from getting dusty or bent. If the differential between heating and cooling was not broad enough, the two systems would fight each other. And with the increased cost of gas and electric power this problem could be expensive. To avoid it, the grower often simply set a large deadband between heating and cooling (up to 10 degrees). This setup would allow temperature swings of as much as 15-20 degrees – resulting in serious losses in production efficiency. Another factor was that the grower had to readjust all thermostats every 2-3 days (starting temperature up to 90 degrees to a 30-day-old temperature of around 70). The use of power ventilation brought the need for automatic curtain drops to prevent catastrophic loss in case of power failure.

Current electronic ventilation control can keep in-house conditions much closer to optimum for birds →


Early electronic control systems introduced in the 1980s had some good features, but were limited and inflexible. Micro-processor-based systems have been greatly improved over the last three to four years, so that they can handle virtually any situation from beginning to end of the growing cycle. Properly designed and operated electronic control systems can now keep temperature and other conditions much closer to optimum for bird performance. These systems can select the optimum ventilation system for the outside temperature and age of birds—negative pressure ventilation, natural ventilation, tunnel ventilation or some other method of cooling.

Backup systems are now even more critical – must be independent of the primary control system →

Again, however, making the investment in high-efficiency controls pay off requires proper management. And in our larger, often totally enclosed houses with higher bird density, it becomes even more important to have backup systems to prevent catastrophic losses in case of equipment or power failure. When the house suddenly heats up, the birds can't open the windows. We may or may not be able to have people there to do it for them. We must have proper backup systems to handle emergencies.


It is important to understand that such systems cannot be part of the primary control system. All backups must be independent, and the more independent the backup system, the better. Following is a brief rundown on the major categories of backup systems:

Controller backups are needed to keep electronic controls within a safe zone



Controls backup. This independent backup is a necessity for any electronic controller. It allows the controller to operate within a window. For instance, if the desired electronic controller target temperature is 75 degrees F, you can set a high limit for cooling with the independent backup system. Most people agree that this setting should be about 10 degrees above target temperature. In this case, it would be about 85 degrees F.

Controller backups must have their own independent sensor



Remember, the target temperature should never be set too close to the “point of disaster.” It’s the grower’s responsibility to keep this system adjusted every 2-3 days to reflect the changing lower temperature need for growing birds. After setting the high limit for cooling, a low limit for heating must be set. Most people also agree that this setting can be about 10 degrees below target temperature. As with the high temperature setting, the grower is responsible for adjusting this temperature lower as birds grow. This backup system can be 99.9 percent effective against electronic controller failure, but only if it is adjusted on a daily basis.

Alarms on critical functions can call personnel for help, even at a distance



Electronic backups have their own sensor, which is placed mid-house and must be totally independent from the electronic controller.

Alarms. Most alarms monitor power failures and high and low temperatures. Other functions, such as water, curtain-drop activation, timer fans, etc., can be monitored. Alarms signal a problem by the use of a siren on the outside of the building. Some operations also connect phone dialers or remote beeper systems to the alarms. As with backup controls, it is imperative that high- and low-temperature settings be adjusted downward as birds mature.

Thermostatic controls on backups must be adjusted as birds grow



One very useful recently developed cycle or high- and/or low-pressure alarm is built into the software of an electronic vent controller. This is made possible through the use of a microprocessor and specially-designed software. Since the electronic vent controller is independent of the electronic controller, it is capable of acting as a watchdog for the primary system.

Curtain Drop. This is one of the oldest forms of backup, and its basic function is to drop the curtains if power fails. They can also work in conjunction with high-temperature thermostats. Again, it is imperative that for this thermostat to be effective, it must be adjusted downward as birds grow. A new feature on some curtain drops is a switch that can signal the alarm that the drop has released. This feature is almost a necessity for fully automated curtain-sided houses.

All houses need backup generators – a *must have* for totally enclosed houses



Release winches that let curtains drop must be kept lubricated and in working order. These systems must be checked periodically during growout. To prevent a curtain from dropping open too much during cold weather, chain limits should be put in place to limit the amount of curtain opening.

Generators. All houses need to have backup generators, but totally enclosed houses *must* have them, since there is no other means of cooling. Curtain-sided houses can drop the curtain and eliminate or greatly limit losses from heat stress. Totally enclosed houses need to have generators that automatically start up seconds after the power fails and then transfer power to the house. It is important that the selected electronic controllers have the ability to stage in the fans to reduce the surge load on the generator. As with the other systems, it is important that these systems be checked periodically.

Managing backups to prevent catastrophe is ultimately up to the grower



Regardless of how good the backup system is, if it’s not properly maintained, losses will continue to occur. These systems must be managed, and failure to do so will result in loss. Once these systems are installed, it is important that the integrator establish a periodic program to be carried out by service people to see that the systems are adequately managed by growers.

The ultimate and primary responsibility for utilization and operation of the backup system lies with the grower. If these systems are not managed almost daily, their proper operation cannot be assured and their settings can go outside the window of safety – and then a catastrophe can take place.

The bottom line: In modern power-ventilated poultry houses, it makes excellent sense to insure against catastrophe by seeing that appropriate backup systems are installed and properly maintained.