PRACTICAL APPLICATIONS

BLOCK, TACKLE, WIN

MINIMUM VENTILATION AND MOISTURE CONTROL

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We are often asked, what is the best thing a producer and company can do to perform well during cold weather? Here is our simple answer to this question: Win minimum ventilation and moisture control. This is achieved by developing an effective, clear and simple game plan that everyone can execute. This newsletter is focused on helping producers and company service representatives prepare houses for efficient and effective cold-weather minimum ventilation. We decided to toss in some football theming along the way to get motivated. It is time to call your minimum ventilation offense out onto the field, huddle up and get ready to score some moisture control points.

Block the Right Vents

Non-brooding-end (aka off-end or grow-out end) perimeter air inlets (aka vents or baffles) should be blocked off during brooding to make sure most/all minimum ventilation air enters the barn in the brooding chamber first and targets the ceiling peak. Not blocking vents is probably the most common minimum ventilation mistake we see producers make during brooding. Any air that enters the non-brooding area of the house and exits the house does not count toward minimum ventilation. Only air that enters the bird area counts. If you do allow air to enter and exit the non-brooding ends and bypass the brooding chamber, that air should be deducted from the minimum ventilation calculations. If a producer uses all the perimeter inlets in the barn during minimum ventilation and does not compensate for this air bypass, this is a "false start." As shown in Figure 1, arguably 50% of the ventilation air will bypass the brooding chamber. In this case, for example, a minimum ventilation run time of 60 seconds ON (240 seconds OFF) would need to be increased to 120 seconds ON (180 seconds OFF) to compensate for the off-chamber bypass ventilation. This would be a good starting point.

We have a simple choice to make to improve brood chamber air exchange. Either add the additional time, or close the non-brooding area vents. It is acceptable to open some vents in the back of the house, but keep in mind that air does not count toward minimum ventilation. We are also looking for about a 1.5"-2" vent opening and, for some houses, this cannot be achieved without blocking some selected vents to get the proper opening. Below are some additional tips on vent management and moisture control.

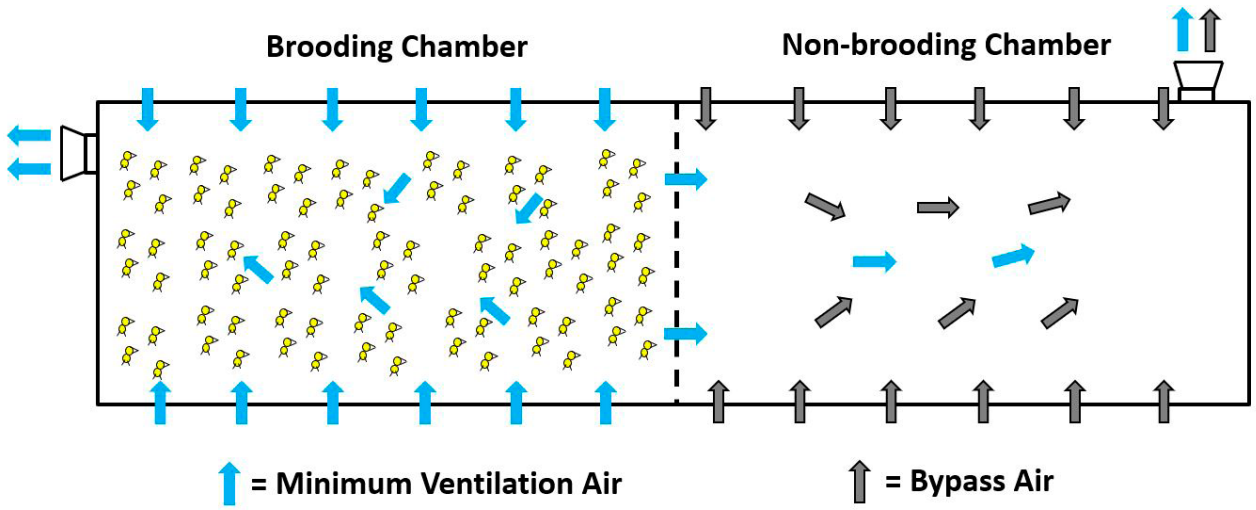


Figure 1: This is an illustration of a common minimum ventilation setup that can make it difficult to get moisture under control. Notice, one fan is ventilating the brooding chamber and the other is ventilating the non-brooding chamber. If the producer is counting both fans for minimum ventilation, this would not give enough brooding chamber air exchange and likely could lead to undesirable results.

Missing vent door insulation: All perimeter vents must be fully insulated so they tightly close when they are not in use. Any missing insulation (Figure 2) will likely be the source of a cold-air leak that throws air directly to the floor. This air works against litter drying (incomplete pass), drafts chicks in the vicinity, causes uneven floor temperatures and causes excessive heater runtime. If the insulation cannot be repaired, it is time to replace the door.

Vents in front of temperature sensors: We do not want cold outside air landing directly on sensors. Most producers know to shut off air inlets that are directly adjacent to temperature sensors to keep this from happening. Leaving these vents open can cause unnecessary temperature fluctuations, excessive heater runtimes and bird movement away from this zone. Sometimes, monitoring heater zone run-times during brooding can help you spot a potential problem if you notice a zone that is running significantly more than others. It is common for the front and back brooding chamber zones to operate more than the middle zones due to heat being lost through the brood curtain or endwall.

Dirty exterior bird wire: Sometimes we find vent screens that are partially or almost entirely blocked off by dust, feathers and dander (Figure 4). This is especially true for vents that are located adjacent to sidewall exhaust fans or across from tunnel fans from adjacent houses. Make sure all perimeter inlet bird wire has been cleaned to ensure that all vents used are capable of unrestricted inlet airflow.

Damaged doors: Ideally, every inlet door in use opens evenly and the same amount during each minimum ventilation cycle. Any bent, rusted or damaged doors should be repaired or replaced prior to cold-weather operation. Any damage that forces the door to either not shut or not open (whether partial or completely) may cause cold air to land on the birds, drinkers and litter, causing more harm than good. This would be considered intentional grounding and a 10-yard penalty.

Cables and sprockets: Vent cables can stretch over time, creating uneven door openings and leaving vent doors at the ends partially open when they should be sealed shut. Take time to adjust vent door connections to make sure all doors open the same amount. Leaving doors open unevenly will cause excessive heater runtimes in those locations. Sprockets must be greased and pulleys must be inspected for signs of wear and possible failure.

Figure 2: This inlet door is a considerable source of air leakage when shut. The insulation has been damaged by rodents. The door does open and shut, but when it is shut, it does not seal and is leaking on three sides. It is overdue for repair or replacement. This can often be found on inlets located closest to the feed cross-fill entrance to the hous,e where rodents have direct access to the house wall and attic space.

Figure 3: The insulation in this inlet door has almost totally disintegrated due to darkling beetles. This vent is another major source of air leakage and is made worse by the insulation settling out of the door and getting wedged between the door and frame. The metal door appears to be in good shape, so we would recommend replacing the insulation on this door. This was not staged.

Figure 4: This photo was taken from inside the house looking through the sidewall vent. The bird wire is almost 70% blocked with dust and feathers. It is next to a sidewall exhaust fan. This vent wire is way overdue for a good cleaning.

Vents without latches: Simple, inexpensive vent door latches can be purchased from your local dealer, ordered online or homemade, if they are fully functional. Many poultry houses are not designed to operate without closing a select number of vents during cold-weather brooding. If you struggle during cold-weather moisture control, this could be part of the reason.

Tackle Maintenance on the Right Fans

Tackle minimum ventilation fan maintenance now. The minimum ventilation fans are the most important fans on the farm — the MVPs. Why is this? Consider this calculation for a broiler house: Minimum ventilation fans cycle every 5 minutes (300 seconds). Every hour, these fans start and stop 12 times. Every day, these fans start and stop 288 times. During cold weather, when the house stays in minimum ventilation for the full brooding cycle (about 10 days), these fans cycle 2,880 times. If we only estimated that these fans were used for seven flocks and only used during brooding (very conservative), then they cycle 20,160 times in a single year. This is just for the time they run during minimum ventilation. These fans require more routine inspection and maintenance. Focusing here can make you, and neglect can break you.

In addition to their high workload, these same fans operate under high static pressures at 0.10 to 0.16 inches of water column every time they run. These fans are often wet with condensation and covered with dust and dander. Dirty interior fan shutters cause these fans to work even harder during operation.

Let's consider this simplified example. If the current fans used for minimum ventilation are operating at 60% of the original designed capacity, the only way to get adequate moisture removal is to add an additional 40% to the current minimum ventilation time to make up for the inferior capacity. This additional 40% runtime would have to be maintained throughout the flock unless the fans are properly tuned up. Now is the time to conduct a complete tune-up on all fans used for minimum ventilation. This means a complete, thorough inspection of each minimum ventilation fan for any maintenance repairs that would hinder, or potentially hinder, performance and air exchange. Additional tips are below.

Shutter and light trap maintenance: Shutters must be cleaned every flock. Any damaged shutter blades, rail guides, butterfly springs or blades stuck in the open position must be repaired or replaced. Sometimes shutters need a good cleaning during a flock as well. All pullet house minimum ventilation fans must have light traps removed, inspected and thoroughly cleaned every flock. Don't let dirty shutters or light traps keep you out of the end zone.

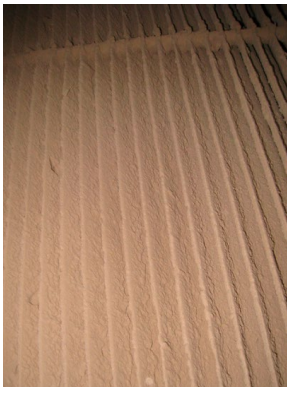
Belts: All minimum ventilation fan belts should be new or like new. Compare used belts to new ones, or measure them to tell. Don't assume that they are good; verify that they are good. Leaving loose, worn belts on fans is equivalent to leaving the third-string running back in the game. Don't expect to get a touchdown. If you can hear the fan squeal on the motor pulley from the control room, fix the fan.

Tensioners: All fan tensioners (Figure 7) must be lubricated, exercised and tested for worn or dry bearings. If the bearing is frozen and the belt is cutting into the pulley, this is grounds for a targeting call. The tensioner should immediately be ejected from the game and replaced with a new one. Most tensioners freeze up in the relaxed position, so make sure the tensioner is placing some stretch force on the belt.

Bearings: All bearings must be greased or replaced (Figure 7). You wouldn't leave a lineman with a torn ACL in the game, would you? Don't leave a dry bearing on a fan. Get it fixed.

Win Minimum Ventilation and Moisture Control

It is general practice to maintain house relative humidity between 50% and 70% during cold weather. Check this first thing in the morning for best results, and make adjustments. If vents are not opening enough, we need to consider blocking the right vents. This forces air to target the ceiling peak, or as close as possible, so that we



Figures 5 and 6: These photos were taken from a pullet house that was only 5 years old. We are pretty sure the light traps, shutters and fans had never been cleaned. There was about 0.25" of dust on shutters, and about 2.5"-3" of dust settled in the bottom of the light traps and framing. Light traps were totally coated in dust, and about 1-1.5" of dust was in the fan housing. This is a personal foul.

allow the incoming air to acclimate, mix and provide fresh air to our house and birds. This is how we remove moisture from the house. We want this to happen as evenly down the house as possible. Some variations to this are acceptable, and this will take some experimenting and adjusting to make it work properly for each house and farm. Tackle maintenance on the right fans. We need every possible cubic foot per minute out of each fan used for minimum ventilation every cycle. Anything less than 100% is a loss in adequate air exchange and static pressure ability. Any inadequacy in fan performance will have to be made up with additional run-time. It is that simple. Don't forget the importance of house tightness and of operating stirring fans during cold-weather preheating and brooding to help you get the edge on your opponent. Win moisture control with effective and efficient minimum ventilation. It may not be the only thing that counts, but it sure carries the team a long way in the right direction. It allows you to compete. We need 100% focus and effort here. Down, set, hut.

For more information on ways to improve minimum ventilation, see our newsletter #86, Four Common Minimum Ventilation Mistakes, from December 2014 on our website, poultryhouse.com.

Figure 7: The bearing inside this tensioner pulley had failed, and the pulley no longer turned. The fan was still in operation, and the belt was cutting into the plastic pulley. The squealing noise due to the friction between the belt and plastic pulley could be heard from outside the house and piqued our interest. Hey referee, we have an injured player on the field here.

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