

# *The Poultry Engineering, Economics & Management* **NEWSLETTER**

**Critical Information for Improved Bird Performance Through Better House  
and Ventilation System Design, Operation and Management**

Auburn University, in cooperation with the U.S. Poultry & Egg and Alabama Poultry & Egg Associations  
Issue No 44, November 2006

## **Winter Maintenance: Setting Priorities**

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Winter is here and now is the time to make sure that poultry houses and equipment are ready for cold weather operation. Fuel prices are continuing to rise and every effort must be taken to optimize every gallon of fuel burned. This newsletter focuses on what we can do to houses to make sure they are running as efficiently as possible.

### **Priority #1: House Tightness**

The number one priority for winter maintenance is house tightness. This can not be stressed enough. It is impossible to have an efficiently running house during the winter months if we cannot control the environment. Most houses today are fully equipped and are capable of controlling the environment inside the house. But the house itself in many cases does not complement the equipment. In order for the equipment to maintain and control the in-house environment properly, the house must be tight! This means that all curtains must be cinched up tight with curtain flaps over the tops and lumber strips at the bottom. All holes in the curtains must be patched. All leaks in the side walls and end walls must be sealed with caulk or spray foam insulation. Seals around doors and vents must be maintained. Holes in the ceilings have to be repaired. Essentially every possible place where cold air can enter the house must be repaired. Pressure checks should be done on a regular basis to ensure that you have a tight house. Conduct the test by closing all doors, vents, fan shutters, etc, and turning on one 48-inch fan, then checking the static pressure. If a house can not pull a 0.12 static pressure during the house tightness test then it cannot do a good job of minimum ventilation. Smoke testing houses will help find air leaks in houses in places where air leaks were never thought possible.



**Cold air entering through cracks or doors, vents or shutters that don't shut properly hurts static pressure and spoils the airflow pattern needed for cold-weather ventilation. Smoke testing during a pressure test is a good way to find unsuspected air leaks. Air can enter a poultry house in places that you would never expect. Even new houses benefit from smoke tests; we frequently find leaks in newly built houses as well.**

## **Priority #2: Fan Maintenance**

The next item of importance is fan maintenance. It is really tough in the winter time to maintain a good in-house environment efficiently without properly maintained fans. Fans should be checked regularly between flocks and throughout each growout to ensure that belts are tight and shutters are clean and operating properly. Fan blades must be kept clean and bearings may need to be greased. Minimum ventilation fans are your workhorses for the winter time. They are what create the negative pressure in the houses and must be kept working in top condition.

## **Priority #3: Vent Maintenance and Management**

It is hard to have a good winter time minimum ventilation program without properly operating vents and vent machines. The number of vents used needs to be coordinated with the fans to be used so that static pressure will be what is needed to pull air in high up in the house through the vents and along the ceiling to get good air mixing. To be a good wintertime ventilator you have to be able to manage vents and fans properly. For detailed information on vent management, see our newsletter #39, *Cold Weather Inlet Management*. It can be found in the publications section of our website: [www.poultryhouse.com](http://www.poultryhouse.com).

Maintaining inlet vents, vent machines, and cables can be a never ending job. Cables continuously stretch or break and require constant adjustment and repair. This equipment cycles on and off thousands of times during the winter months and must be kept up. Vent system cables can be replaced with a continuous steel rod system to cut down on the frequency of adjustments throughout the year. Rusted pulleys often wear into cables and can be replaced with chains and sprockets for more durable and reliable operation at 90° turns. The insulation on the back of vent doors must be maintained to keep condensation from forming on them and promoting heat loss. Vent door hinges get corroded and bind, causing damage to the doors and malfunctioning. Hinges should be oiled to prevent this problem. The gears and fittings in vent machines need to be greased and cable connections need to be maintained to cut down on wear and tear on vent machines.

## **Priority #4: Heater Maintenance**

Heater maintenance should also be very high on every grower's list for wintertime maintenance. A heater that is not operating properly is wasting expensive fuel. We often go on field visits and find poorly operating heaters and brooders as a result of poor or no maintenance. We see stopped up burner and pilot orifices; direct spark igniters that will not fire; heaters operating at low pressure due to malfunctioning regulators or undersized plumbing or fittings that are leaking gas. Pressure checks can be done on a plumbing system by checking the pressure at the last heater at the end of the plumbing line. Get a qualified person to help you if you are not comfortable working with gas. Consult the manufacturers' requirements for operating pressures. Many low pressure heaters that use propane should operate between 10-12 inches of water column. Heaters that are using natural gas should be operating between 6-8 inches. If the system is operating at too low pressure, check all plumbing fittings for leaks with soapy water and a paint brush or spray bottle. No open flames! Low pressure means poor heater efficiency. Kinked, dry rotted, and burned brooder gas supply hoses can fail and cause house fires.

## **Priority #5: Upgrade Insulation if Needed**

A house with very little or no insulation in the side walls or ceilings wastes a great deal of fuel during the wintertime. Our last newsletter, #43, *Poultry House Energy Retrofits for Fuel & Cost Savings*, deals with adding insulation to an existing house. Even with new solid sidewall houses there are two places in every house that are nearly always subject to heat loss. These are the tunnel inlet and the tunnel fan ends of the house. It is difficult to add insulation to the tunnel inlets because they have to be left so that they can be operable during emergency situations. Tunnel doors that seal properly are a great remedy to the problem. Other less permanent methods of tightening and insulating the tunnel inlets offer lower cost solutions. Some growers have had success with adding an additional interior curtain to the tunnel inlet. This creates an air cavity between the two curtains and can be a very effective when installed properly. Others have used 4 x 8 sheets of 1-inch rigid board insulation placed between the posts and the bird



Common vent system problems are loose aircraft cables, rusted vent hinges, worn cable pulleys, rusted chain and sprockets, poorly maintained vent machines and restricted vent inlets. A can of oil and a grease gun go a long way toward extending the life of a vent system. Thumb latches should be installed on every vent door to enable the grower to shut off unused vents when they are not in use.



Common causes of poor brooder operation are kinked gas hoses, faulty regulators, undersized plumbing, clogged burner orifices, and leaks in the plumbing system. The propane burning brooder at the left is operating at the correct pressure (11 inches water column). The one at the right is running on low pressure (5 inches water column). Brooder maintenance can not be stressed enough!



The picture on the left shows one way of sealing off an unused fan for the winter to cut down on heat loss and unwanted air entering. A second curtain can be installed on the interior side of the tunnel inlet for added protection from air leaks. Board insulation can also be added to most any tunnel inlet to help add some R-value to that area of the house.



Stir fans reduce temperature stratification by thoroughly mixing in-house air during and between minimum ventilation run times. Almost any house will benefit from the addition and proper use of stir fans during wintertime. Almost any house can benefit from stir fans, but the benefits are more pronounced in older houses that are loose, have curtains and have high ceilings.

wire to add some R-value to the inlet area. Whatever method is used, remember that it must be removable during emergency situations. As for the tunnel fan end of the house, many have had success with simply placing an oversized piece of curtain material or plastic sheeting between the shutter and the frame to cut down on air entering through the shutters. This can only be done on fans that are locked in the off position and are not designated as emergency backup fans. Some growers have made or purchased fitted covers that fit over the cones of the fans to help prevent air infiltration through unused fans. The good thing about some of these cone covers is that they are made so that they blow off of the fan and do not cause damage if the fan happens to come on.

## Priority #6: Consider Stirring Fans

What about stir or circulation fans? Stir fans cut down on temperature stratification throughout the house by continuously mixing the air. They also promote moisture removal from the house during minimum ventilation because the well mixed warmer air pulls more moisture from the litter and house than non-mixed air.

Stir fans can be installed in almost any house with the confidence of getting some cost savings in fuel and benefit from an improved in-house environment. Older curtain-sided, non-insulated, loose houses benefit more from the addition of stir fans than any of the others because the environment is not as controlled as it is on newer, tighter, more modern insulated houses. Newer houses can also reap the benefits from using stir fans, but the room for improvement is at a smaller margin.

## The Bottom Line

Proper maintenance saves a grower money in three ways: First, regardless of whether houses are new or old, thorough maintenance must be done on all equipment and even the house itself to ensure a long service life and a good return on your investment. Second, properly servicing equipment and the house itself is the first step toward energy savings. And third, thorough and regular maintenance of the house and its equipment ensures that the ventilation system can provide the right in-house environment for top flock performance.



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This newsletter is produced in cooperation with the U.S. Poultry & Egg and Alabama Poultry & Egg Associations, as part of their commitment to poultry industry education. We appreciate their support and are proud of our relationships with these organizations.



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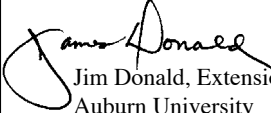
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