The University of Georgia
Cooperative Extension Service
College of Agricultural and Environmental Science/Athens, Georgia 30602-4356

Poultry Housing Tips

Potential Problems with Blown Insulation in Dropped-Ceiling Houses

Volume 17 Number 4 **March, 2005**

Figure 1. Missing blown ceiling insulation.

Figure 2. Missing ceiling insulation near side wall

Having quality ceiling insulation is of significant benefit to poultry producers year round. During cold weather, hot air produced by the brooders, furnaces and the birds quickly rises towards the ceiling. If the ceiling is not properly insulated, this valuable heat will pass through it, resulting in lower house temperatures and higher heating costs. Conversely, during summertime, ceiling insulation keeps the amount of heat entering the house through the ceiling to a minimum. On a hot summer day, attic temperatures in dropped-ceiling houses can easily exceed 130°F. If a ceiling is not properly insulated, heat from the attic space will enter the house, leading to higher house temperatures and lower bird performance.

The most common form of insulation used in dropped ceilings today is blown cellulose. Cellulose is a good insulating material, relatively easy to install and, most of all, inexpensive. Though most dropped ceilings are properly insulated when installed, over time problems can occur related to maintaining uniform distribution of the cellulose. Insulation distribution problems can go unnoticed for years for the simple reason that, at first glance, all dropped ceilings look pretty much the same regardless of the condition of the insulation on top of the vapor barrier. Furthermore, very few people go up in their poultry houses' attic space to check out the condition of their cellulose insulation.

Recently, images taken with a thermal camera provided a unique view of dropped of ceilings with cellulose distribution problems. Figures 3 and 4 were taken in two different broiler houses during brooding. The lower ceiling surface temperatures near the peak is an indicator that there is little or no ceiling insulation present behind the vapor barrier and

significantly more heat is leaving through the peak of the ceilings than through other areas of the ceiling. The thermal images in Figures 5 and 6 were taken in houses during hot weather. The higher ceiling temperatures in the vicinity of the peak (Figure 5) and near the side wall (Figure 6) again indicate insulation distribution problems, but this time extra heat is flowing from the attic space into the house from the warmer areas of the ceiling.

There are a number of possible of causes of the lack of insulation near the peak and side walls of a dropped ceiling house. First, exhaust fans turning on and off tend to pulse the ceiling a little which over time can tend to shake the insulation down toward the side wall (Figure 1). Secondly, strong winds can also shift cellulose insulation, especially if the eaves are not closed sufficiently (Figure 2). Last but not least, insufficient amounts of insulating material may have been blown in originally or was simply not blown in uniformly.

It is important to realize that blown cellulose can lose its insulating ability if it becomes wet as a result of moisture leaking into the attic space through a poorly sealed ridge ventilator or nail holes. Moisture can not only reduce the insulation value of cellulose directly, but over time the insulation will compress, leading to reduced insulation value even after it has dried.

What can this cost a producer? It is difficult to determine precisely because it depends on a variety of factors (i.e., size of insulation void, outside temperature, inside temperature). But as a general rule, during brooding, a two-foot swath of missing insulation in a 250' brood area could increase propane usage by 30 to 50 gallons a day. During hot weather, the heat entering through a two-foot swath that ran the length of the house would be roughly equivalent to the heat produced by nearly 2,000, five-pound broilers and would result in a slight increase in house temperature.

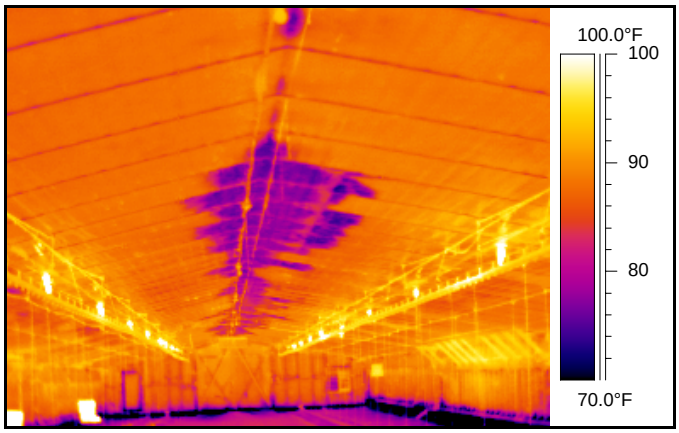

Figure 3. Thermal image of missing ceiling insulation taken during cold weather.

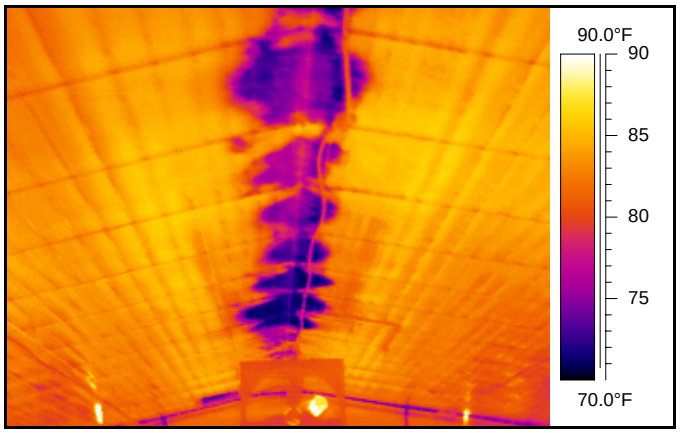

Figure 4. Thermal image of missing ceiling insulation.

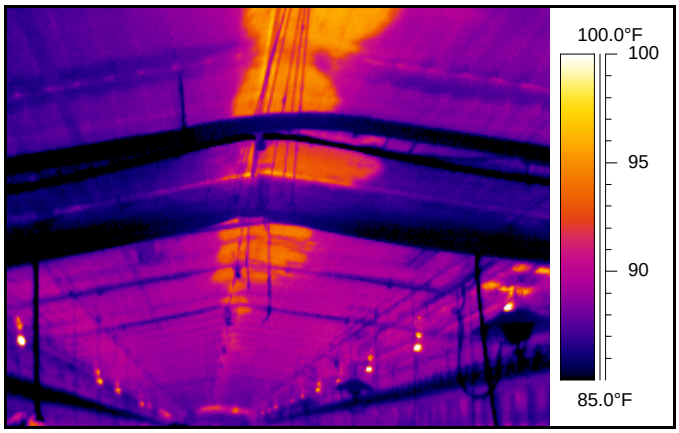

Figure 5. Thermal image of missing ceiling insulation taken during hot weather.

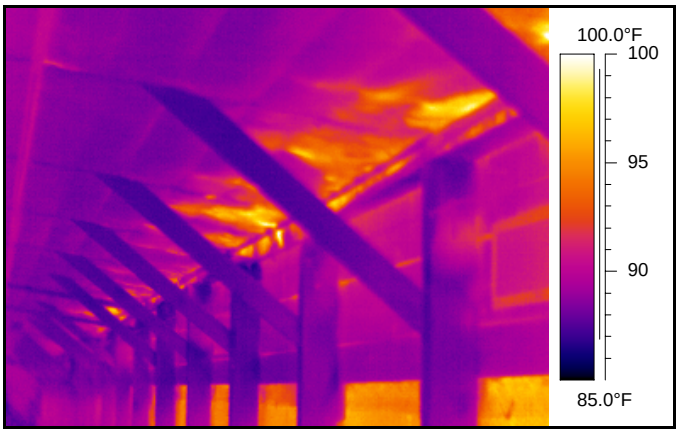

Figure 6. Missing ceiling insulation near side wall.

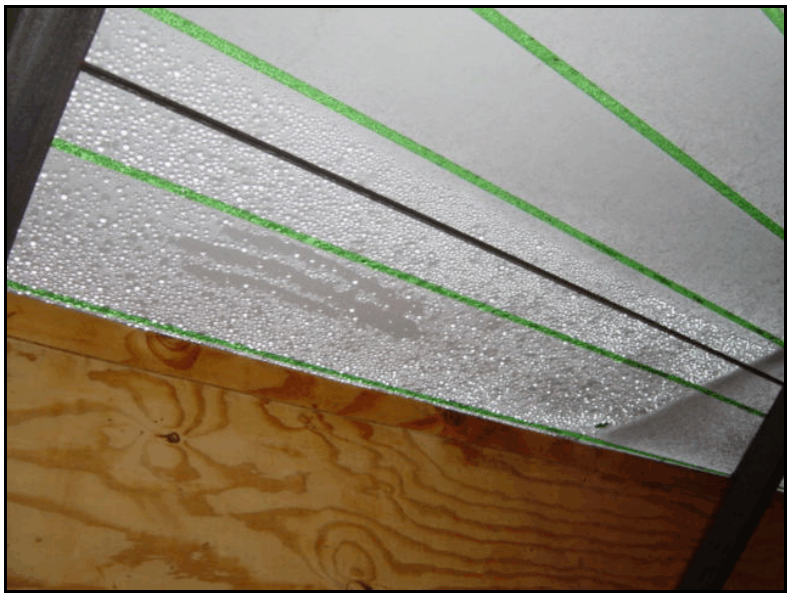

Figure 7. Condensation due to missing ceiling insulation

Though a thermal camera easily points out problems with dropped-ceiling insulation, a noncontact thermometer (infrared temperature gun) can do a good a job of uncovering ceiling insulation problems. During cold weather a noncontact thermometer can point out cold spots and during hot weather can uncover hot spots, indicating insulation voids. If you don't have a noncontact thermometer, during cold weather simply look for condensation forming on the ceiling. Chances are if there are small beads of water present there is little or no insulation on top of the vapor barrier (Figure 7). Once you have spotted a potential problem area, a quick peek into the attic space can be helpful to fully evaluate the problem. The good news is that blowing in a little insulation to fill voids is not necessarily an expensive proposition.

There are steps you can take when installing blown cellulose insulation that will help to minimize the shifting of insulation from the peak of the house. First, before blowing insulation, a four-foot swath of 3 ½' fiberglass batt can be installed at the peak of the ceiling (Figure 8). Cellulose insulation is then blown on top of the fiberglass batt, minimizing the possibility that the peak of the ceiling will be left uninsulated. A further improvement would be the installation of 1" X 4" insulation stops between the lower cords of the trusses before blowing in the cellulose (Figure 9). The insulation stops act as dams keeping the insulation from sliding toward the side walls and away from the peak. To minimize the chance of high winds blowing ceiling insulation away from the side walls (Figure 2), eave openings should be no more that one inch in height. Do not totally close off the eaves because fresh air is needed to help remove moisture from the attic space as well as help minimize attic temperatures during hot weather.

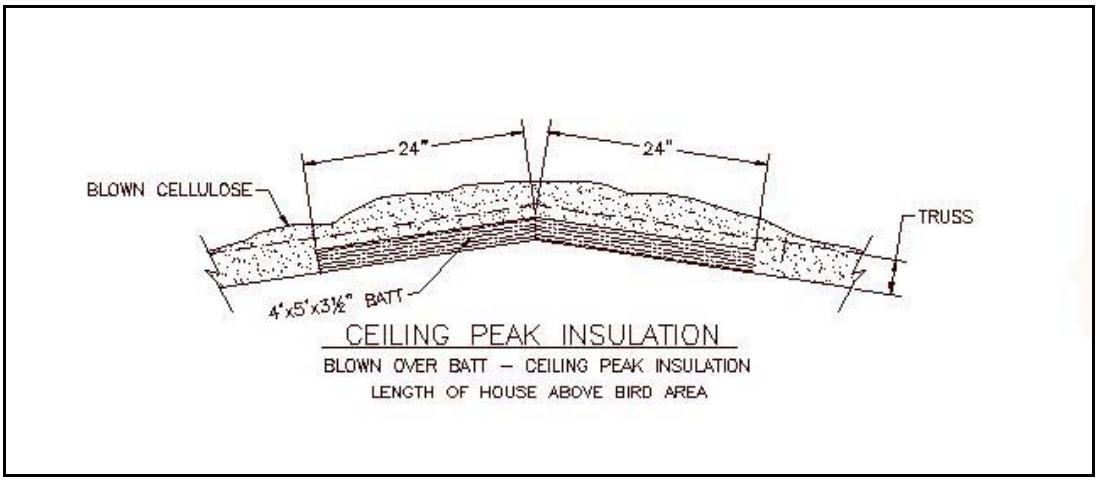

Figure 8. Ceiling peak insulation.

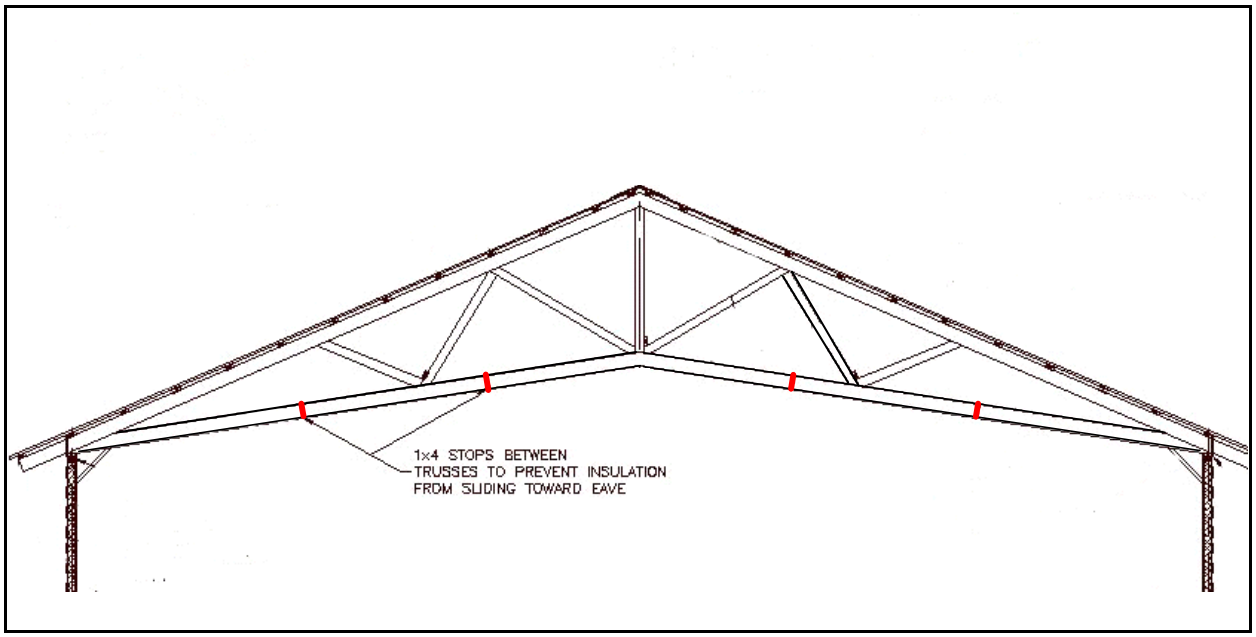

Figure 9. Ceiling insulation stops

Maintaining the proper level of ceiling insulation is one of the keys to keeping your birds warm during the winter and cool during the hot weather with a minimum of energy usage. Simply realizing the blown ceiling insulation can shift is the first step in preventing excessive heat loss/gain through your ceiling. Using an inexpensive noncontact thermometer to look for cold/hot spots, or watching for condensation on a cold winter day, or simply taking a look up in your attic space one a year are a few of the simple ways you can uncover this potentially costly problem.

Michael Czarick
Extension Engineer
(706) 542-9041 542-1886 (FAX)
mczarick@engr.uga.edu
www.poultryventilation.com

Jim Donald
Extension Engineer
Auburn University
jimdonald@aces.edu
www.poultryhouse.com

Provided to you by:

Color copies of the newsletters as well as others can be downloaded from www.poultryventilation.com (no charge)

To receive Poultry Housing Tips via email contact us at mczarick@engr.uga.edu

Color subscription price is $50 per year (Black and white $15 per year).