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Poultry Housing Tips

Potential Problems with Evaporative Cooling Pad Structures

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Figure 1. Evaporative Cooling Pad Structure - Without Pads

Placing fogging pads or recirculatory pads in a false wall a couple of feet from the side of the house is gaining popularity among poultry producers. The space between the pads and the side wall of the house allows the producer easy access to both sides of the pad, making pad and curtain maintenance easier as well as minimizing the possibility of water from the pad entering the house and wetting the litter. Though for the most part these pad structures have proven very beneficial, there is a potential for reduced pad cooling during hot weather if these structures are not built properly.

It is relatively difficult for exhaust fans to pull air through an evaporative cooling pad and into a house. In fact, it is about two to three times easier for the exhaust fans to pull air into a house through an open door than it is through an evaporative cooling pad. Therefore, if a producer were to leave a small access door to the pad structure open, the cool air coming through the pad would be diluted with a relatively large amount of hot outside air entering through the open door, causing the house temperature to rise.

Just as tunnel fans can pull air from the outside of the house through an open door, they can also draw 130ºF air from the attic space if there are any openings between the pad structure and the attic space. These openings do not have to be very large to have a significant effect on a grower's ability to keep the- houses cool during hot weather. In fact, just the openings into the attic space created by the corrugations in the metal roofing can increase the temperature of the house as much as two degrees on a hot summer day.

Figure 2. Evaporative cooling pad structure

Figure 3. Illustration of air being pulled through an evaporative cooling pad as well as from the attic space by tunnel ventilation fans.

The effect of not having an air-tight seal between the evaporative cooling pad structure and the attic space can be seen in the graph on the following page. Temperature sensors were placed near the top and bottom of the tunnel curtain opening of a tunnel-ventilated house with an evaporative cooling pad structure without an air-tight ceiling. Outside temperature as well as the temperature of the air 30' from the evaporative cooling pad was also monitored. There were no birds in the house at the time of the study.

The air entering through the bottom of the tunnel curtain opening was approximately 83ºF, while the air entering the house through the top of the tunnel curtain opening was between 85ºF and 89ºF. The relatively large variation in air

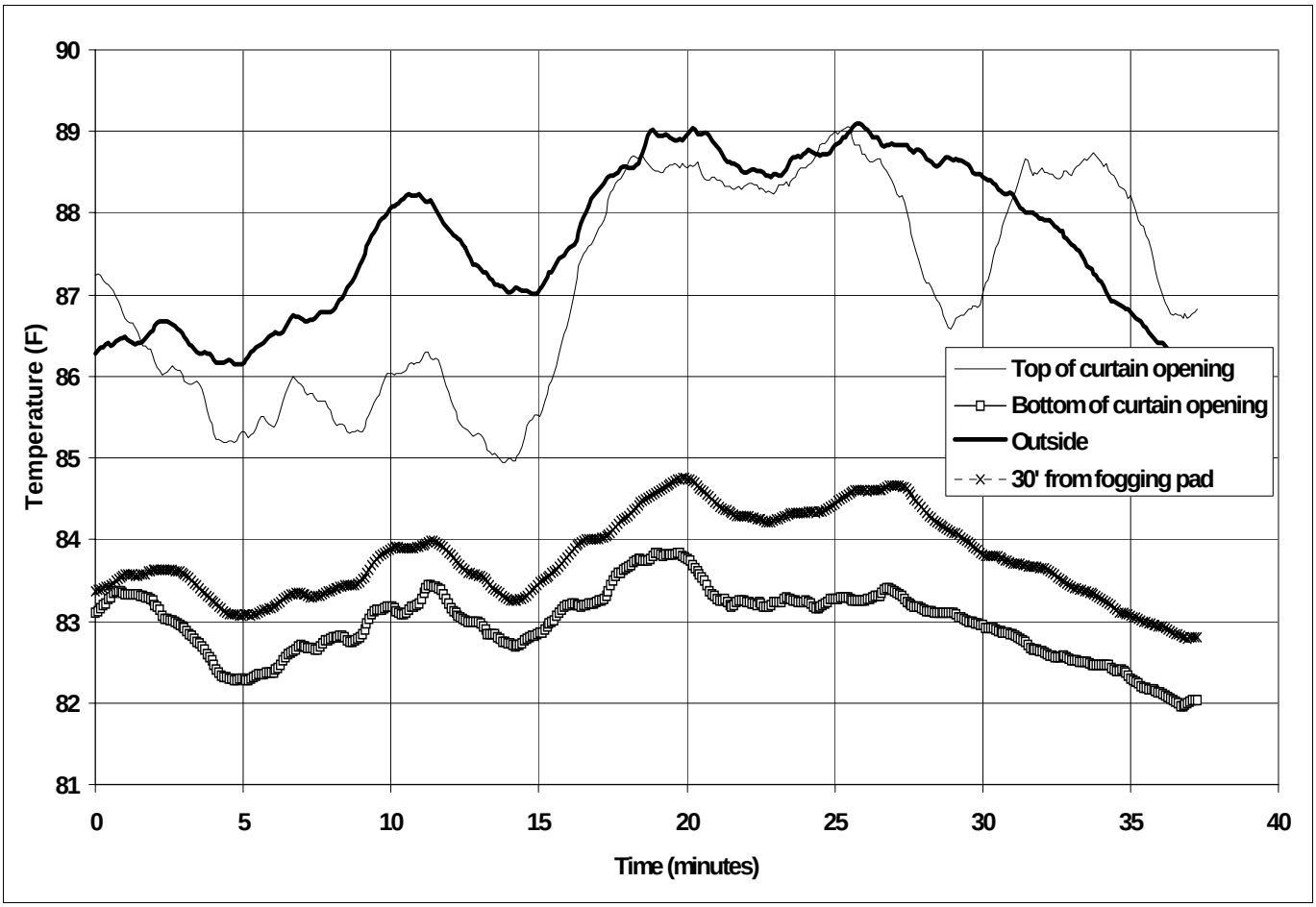

Figure 4. Air temperatures in house without an air-tight ceiling in the evaporative cooling pad structure.

temperature seen in the air entering through the top of the curtain opening was caused by the fact that it was a partly cloudy day and when the sun went behind a cloud the attic temperature would decrease. When the sun emerged the temperature of the air in the attic would increase rapidly. The air entering the house through the top of the tunnel curtain opening was not 130°F, typical attic air temperature, because some mixing had already occurred with the cooled fogging pad air prior to entering through the tunnel curtain opening.

If the pad structure would have had an air-tight ceiling the temperature of the air entering through the top of the tunnel curtain opening would have been the same as that measured coming through the bottom of the tunnel curtain opening. In that case the temperature of the air measured 30' from the evaporative cooling pad would have been the same temperature as that measured at the bottom of the tunnel curtain opening. But, since in this situation the cool air entering through the bottom of the tunnel curtain opening was being diluted with warmer air coming through the top of the tunnel curtain opening, the end result was the house was running one to two degrees warmer than it should have.

If you have a pad structure without an air-tight ceiling you are losing some ability to cool your birds. How much cooling depends on how much opening you have between your pad structure and your attic space. In this case the producer was losing one to two degrees cooling because hot air was only being drawn through the corrugations in the metal. But, if the boards covering the openings between the trusses into the attic space were loose fitting or (worse yet) missing, another couple of degrees of cooling could be sacrificed.

The problem of pulling air out of the attic space and into a house is fairly easy to recognize. Stand in front of your tunnel curtain opening on a sunny, hot summer day and feel the temperature of the air at the top and bottom of the tunnel curtain opening. If you have hot air hitting you in the face and cool air blowing over your arms you are pulling air out of your attic and you need to install an air-tight ceiling in your pad structure.

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Provided to you by:

Figure 5. Evaporative cooling pad structure with “dropped ceiling”