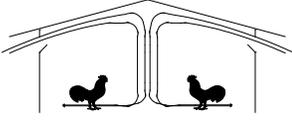




The University of Georgia

College of Agricultural and Environmental Sciences
Cooperative Extension



Poultry Housing Tips

How Does Tunnel Fans Placement Affect Fan Performance and Air Distribution? - Part 1
Volume 23 Number 9 September, 2011

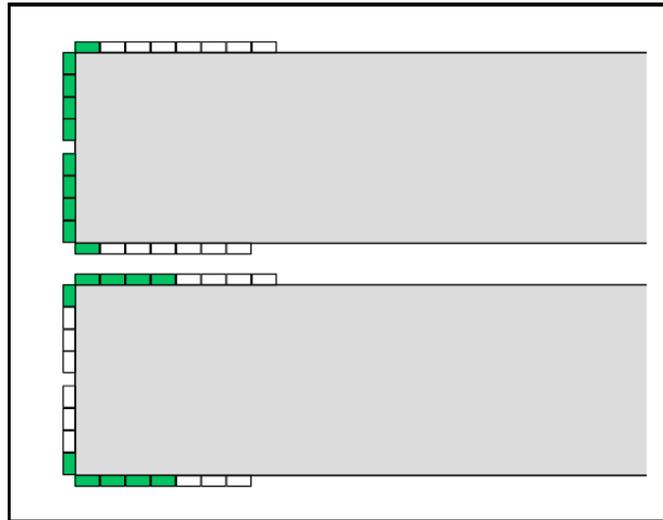


Figure 1. Tunnel fan position.

A common question for people building tunnel-ventilated houses is how tunnel fan location affects the air-moving capacity of tunnel fans. Many believe that placing the tunnel fans in the end wall maximizes the air moving capacity of tunnel fans because the air doesn't have to turn before exiting the house, while others believe that placing fans in the side walls near the end wall doesn't adversely affect fan performance.



Figure 2. Anemometer poles in 60' wide house.

Recently a study was conducted in 60' wide tunnel-ventilated broiler house with 23, 52" tunnel fans to examine how tunnel fan location affects the air-moving capacity of the fans as well as air distribution. The house was selected due to the large number of tunnel fans in both the end walls (8) and side walls (17). Five poles, with three anemometer on each, were evenly spaced across the width of the house approximately 100' from the tunnel fan end wall (Figure 2). The anemometers were mounted on each pole two feet above the floor, two feet below the ceiling and 4.5' above the floor. Each of the 15 anemometers were connected to a data logging system that recorded air speed every minute for 15 minutes. The 15 anemometers allowed a very accurate determination of both the average house air velocity and air velocity distribution across the width of a house.

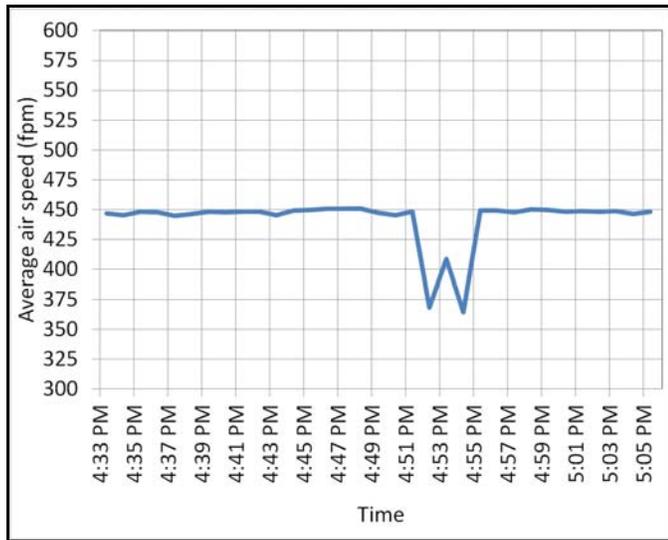


Figure 2. Average air velocity fans in the end wall vs. side walls.

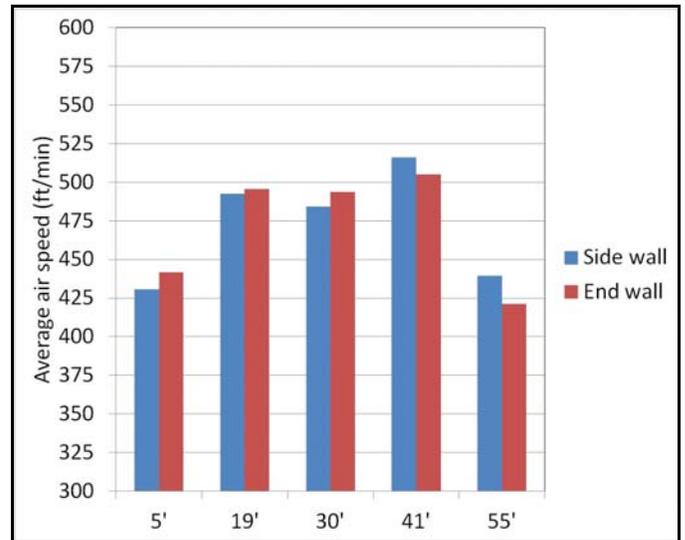
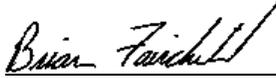


Figure 3. Air velocity distribution for fans in the end wall vs. side walls.

Two tunnel fan operation configurations were tested: Eight tunnel fans in the end wall plus two in the side walls and eight tunnel fans in the side walls plus two in the end wall (Figure 1). In Figure 2 it can be seen that the average house air velocity when operating the tunnel fans in the side walls (4:33 p.m. to 4:51 p.m.) was not significantly different than when the fans in the end wall were operating (4:57 p.m.+). Since there was no difference in average house air velocity it can be concluded that fan positioning did not affect the air-moving capacity of the fans. Figure 3 shows the average air velocity of each of the five anemometer poles positioned across the width of the house with fans operating in the end wall versus the side walls. From the graph it is clear that tunnel fan positioning had little effect on the general distribution of air across the width of the house. That being said, had the anemometer poles been placed very close to the end wall (less than 20'), lower air velocities would have been measured when the fans were operated in the side walls due to the fact that some of the air would have exited the house before reaching the anemometers. But, for the majority of the birds in a house, tunnel fan positioning has no significant effect on air velocity moving over their bodies and therefore the cooling they receive during hot weather.

The fact is that exhaust fan positioning has very little effect on the air moving capacity of the fans is primarily due to the fact that the air velocities in tunnel-ventilated poultry houses are relatively low. Though it is true, the higher the air velocity the more likely the turning of the air exiting side wall fans would cause an increase in pressure (thus reducing the performance of the tunnel fans), studies conducted in a number of tunnel houses, even with average air velocities of over 700 ft/min, have not found any significant reduction in fan performance by installing fans in the side walls of a tunnel-ventilated house. To have a significant effect on overall fan performance, the average air velocity in a tunnel house would likely have to be well over 1,000 ft/min, which is not likely to be seen in a poultry house.


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


 Brian Fairchild
 Extension Poultry Scientist
 (706) 542-9133
brianf@uga.edu