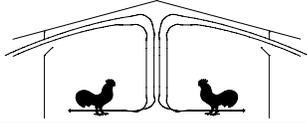




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Poultry Housing Tips

1/15 hp Circulation Fan Update

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Over the last couple of years 1/15 hp circulation fans have been installed on hundreds of farms across the U.S. The vast majority of producers have found the fans to reduce fuel usage, keep house temperatures more uniform, and improve litter conditions. As with any new product, a number of lessons have been learned as to how to get the most out of 1/15 hp circulation fans. The following are a few points to consider when installing and operating 1/15 hp circulation fans:

- 1) Field testing has found that for the most part all 18 - 20" 1/15 hp fans perform fairly similar. The 1/15 hp fans typically move between 2,000 and 2,500 cfm and when properly installed can move air along a dropped ceiling between 60 and 70 feet. To maximize the mixing of the air from floor to ceiling as well as from one end of a house to the other 1/15 hp circulation fans should be installed no further than 70' apart.
- 2) Most houses with a 200 - 250' brooding area should have three circulation fans. The first two fans should direct air towards the end wall (first fan 60'-70' from the end wall) and the third fan positioned 60 to 70' from the brooding curtain directed to blow air toward the brooding curtain. This set up tends to push warm air from the center of the house into the typically cooler areas near the tunnel curtains and brooding curtain. It has been observed that there can be a slight cool spot between the second and third fans in the brooding area. A cool spot between the second and third fan is most often caused by one or a combination of the following: no brooders or furnaces between the second and third fans, the second and third fans are closer than 30' apart, and/or the fans are installed so they blow air at a downward angle.

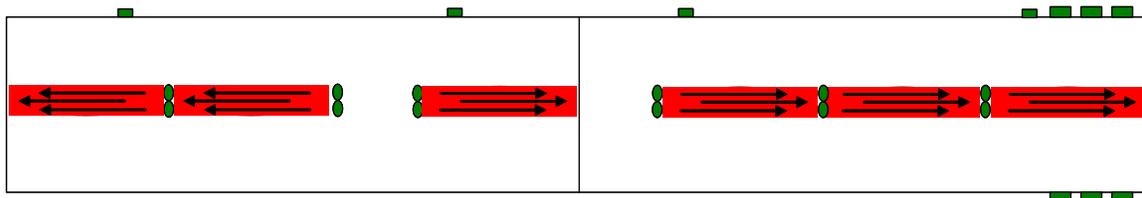


Figure 1. 1/15 circulation fans in a 40' X 400'-500' broiler house

PUTTING KNOWLEDGE TO WORK

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The circulation fans on the nonbrooding end should all be installed so they blow air towards the tunnel fan end wall. Fans should be installed 60' to 70' on center with the last fan in the series 60' to 70' from the tunnel fan end wall.

- 3) Due to the increased volume of 500' X 50' houses it is best to increase the total number of circulation fans to eight, four in the brooding end and four on the nonbrooding end. The four fans on the brooding end can be installed in a couple of different ways. If a producer feels their tunnel curtain area tends to run very cool then three fans approximately 55' on center should be installed blowing towards the tunnel curtain end wall (Figure 2). The fourth fan should be positioned 55' from the brooding curtain blowing towards the brooding curtain. If a producer feels the tunnel curtain area is not a major problem, they can opt to install their circulation fans so that two fans (55' on center) blow toward the tunnel curtain and the other two fans (55' on center) blow towards the brooding curtain (Figure 3).

All four fans on the nonbrooding end should be positioned to blow air towards the tunnel fan end wall. Circulation fans should be installed again approximately 55' on center with the last fan in the series approximately 55' from the tunnel fan end wall.

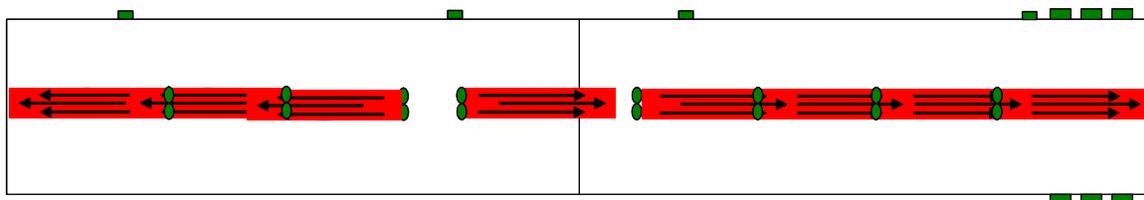


Figure 2. 1/15 hp circulation fans in a 50' X 500' house (Option A).

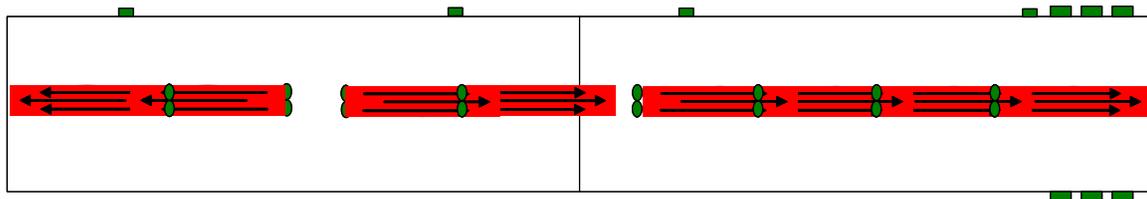


Figure 3. 1/15 hp circulation fans in a 50' X 500' house (Option B).



Figure 4. Incorrect installation.



Figure 5. Correct installation.

- 4) Circulation fans should be installed to blow air horizontally along the ceiling (Figure 4). Fans positioned so that they blow air downward at even a slight angle can tend to be problematic (Figure 5). First, when circulation fans are pointed down even at a slight angle they can cause a slight draft at floor level. Secondly, when the fans blow downward it tends to reduce the flow of air along the floor in the opposite direction (Figure 7). When the fans are next to the ceiling there tends to be air flow in the opposite direction along the floor which tends to mix the air in the house from end to end helping to make the house temperatures more uniform from end to end (Figure 6). When fans are directed downward this tends to hamper air flow in the opposite direction sometimes “piling up” heat in the end of the houses. The fans do not have to be tilted down much to harm the return air flow pattern. Tilting fans just as little as five degrees can have a significant effect on the overall performance of the circulation fans. The rule with 1/15 hp circulation fans is that if you can feel a draft, they are not installed properly.

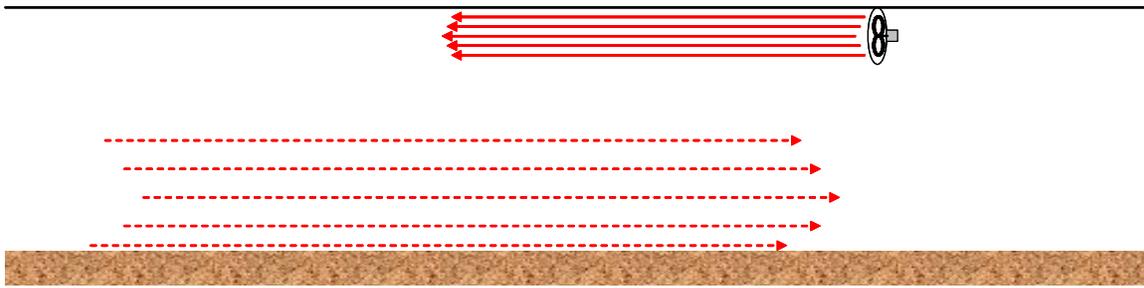


Figure 6. Counter-flow circulation pattern with fan blowing horizontal along ceiling.

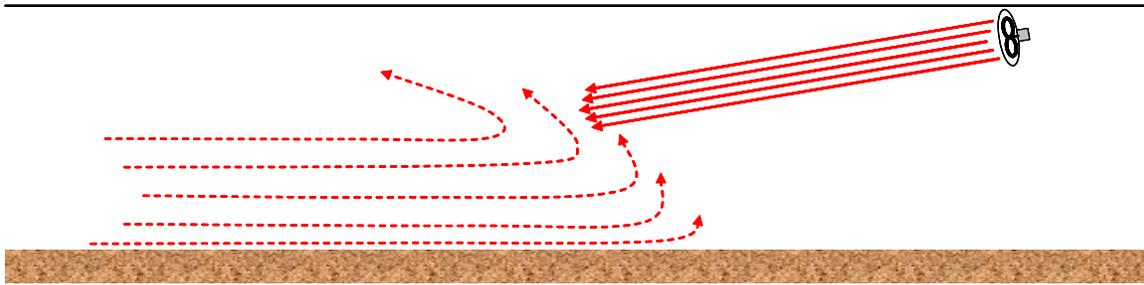


Figure 7. Circulation fan blowing downward.

- 5) Circulation fans should be installed as close to the ceiling as possible. A circulation fan installed against a ceiling will throw air significantly further than one that is a foot or more below the ceiling. The reason for this is that a jet of air, whether it is coming from an inlet or a fan, has less “friction” working against it if it can “attach” to a ceiling. This is one of the reasons why side wall air inlets should be positioned as close to the ceiling as possible. The cold fresh air entering a house attaches to the ceiling and as a result is thrown further into the house improving the distribution of fresh air throughout a house (Figures 8 and 9). When a circulation fan is placed next to the ceiling it will throw air further. Whereas a fan positioned a foot or more below the ceiling may only move air 40 to 50 feet, the same fan next to the ceiling may blow air 60 to 70 feet.

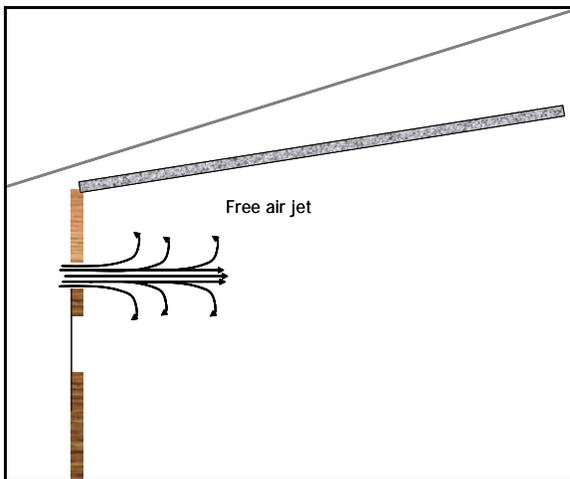


Figure 8. “Free” inlet air jet.

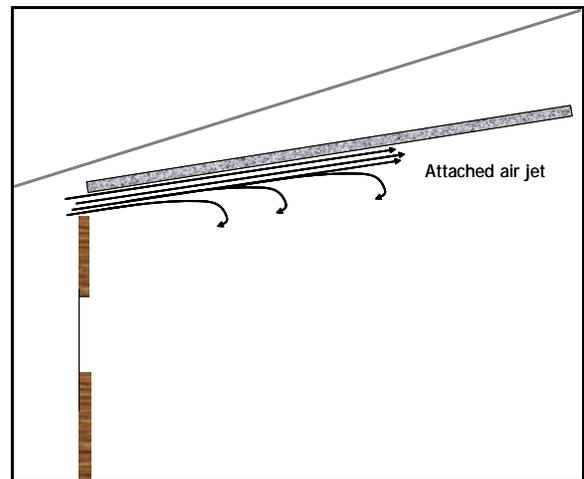


Figure 9. “Attached” inlet air jet

- 6) Circulation fan screens should be cleaned regularly. Dust can quickly accumulate on fan screens leading to dramatically reduced performance (Figures 10 and 11). It is important to keep in mind that 1/15 hp fans are not very powerful. Even a clean guard reduces the throw of most fans between five and ten feet. It is not uncommon to find that by the end of the flock the throw of circulations fans is reduced to 30 feet or less.

Do not use a pressure washer to clean 1/15 hp circulation fans. The blast from a pressure washer can easily bend the rather fragile blades of many 1/15 hp fans. Furthermore, pressure washing can force water into the fans motor causing it to seize. The fact is the dust that accumulates on the fans is typically very easy to clean off with a broom or backpack blower and if done on a regular basis (at least at the beginning of a flock) is not an extremely time consuming task.



Figure 10. Dirty circulation fan.



Figure 11. Clogged screen.

- 7) 1/15 hp circulation fans do not need to be controlled through an interval timer. Ideally, circulation fans should be operated continuously to mix the air in the house from floor to ceiling and end to end. In the past larger circulation fans tended to create a draft if run continuously and as a result had to be controlled through a timer. This is not the case with the 1/15 hp fans. When installed properly, the 1/15 hp fans should not create a draft at floor level and as a result there is no reason to operate them off a timer. The fact is that benefits typically associated with the fans will be significantly reduced when operated on short timer cycles, i.e, 30 - 60 seconds out of five minutes.
- 8) 1/15 hp circulation fans are most useful when houses are operating in a minimum ventilation/heating mode. When a house is ventilating to control temperature the inlets themselves do a good job of mixing the air from floor to ceiling. End to end mixing by the circulation fans tends to be reduced because the ability of the fans to move air down the house is hampered by the air constantly flowing across the house from the air inlets. As a result, if a house has older birds and exhaust fans are operating off of temperature circulation fans can be typically turned off.
- 9) 1/15 hp fans use between 90 and 100 watts of power. Operating cost for a house with six fans typically runs around a dollar a day.



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