Report from the Field:

Stir Fan Options for High and Low Ceiling Poultry Houses

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Introduction

In the past two years growers have become increasingly interested in doing everything possible to reduce fuel costs and improve the environment within the poultry house during wintertime operations. Because warm air rises and cold air falls, there is often a 5- to 8-degree (F) difference in temperature between floor and ceiling temperatures in houses. This is more pronounced in high ceiling than in low ceiling houses. One of the options to help minimize this temperature difference and recirculate some of the heat in the top of the house is to install stir fans. Listed below are several options that are currently being used to recycle heat. The recycling of heat will not only reduce fuel cost but can also improve litter quality and reduce sweating in most houses. There are many different ways to accomplish this. The methods listed below are some of the most common ways in which growers in the Southeast U.S. have attacked the problem of recirculating air in the house. For more information, see *Alabama Poultry Engineering & Economics Newsletter* issue #13, "Paddle & Recirculating Fans – A Progress Report," available at *www.poultryhouse.com*.

Low Ceiling Houses with Paddle Fans

In dropped-ceiling houses, some companies use six paddle fans in the brood chamber with three in the growout chamber. Others like five fans in the brood chamber and three in the growout chamber. Either setup will work when fans are spaced properly (see diagram below). These fans should be set in the up-blowing mode and on variable speed control. This pulls up and mixes cooler floor air with warmer ceiling air and pushes it out toward the sidewalls, and avoids putting a draft directly onto the birds. Fans should be wired so that the brood end can be operated separately from the growout end. Thermostats or sensors should be located close to the ceiling in each end of the house and set approximately 5 degrees above target temperature. Thermostat settings may need to be manually adjusted as growout progresses. If possible, fans should be operated only during minimum ventilation off time, which can easily be accomplished with an automatic controller. Fans should be hung a practical distance from the ceiling without interfering with other equipment, such as catching and clean-out equipment that may be used in the house. Some growers prefer to use cord and plug connections that allow removal of the fans before catch or clean out.

Low Ceiling Houses with 24-inch Round Panel Fans

The most common panel-fan installation for a 40 x 500 house is six fans, three in the brood chamber and three in the growout end of the house. The fans should start from the

center (brood curtain) and blow towards the end wall in each chamber (see diagram for spacing). This arrangement creates a race track pattern of air circulation in each chamber without blowing air directly on the birds. Variable speed type fans give the ability to calibrate fans for desired airflow and mixing. Fans can be operated with an automatic controller, and should if possible be set to run only during the minimum ventilation off cycle. Fans should be put on two different circuits, the fans in the brood end on one circuit and the ones in the growout end on another. Each fan should be arranged on a winching mechanism so that it can be swung up parallel to the ceiling to provide clearance for clean-out or automatic bird catching equipment. There should be one thermostat located near the ceiling in each chamber set approximately 5 degrees above target temperature. This may require manual adjustment as growout progresses.

High Ceiling Houses with Paddle Fans

Most high ceiling (steel truss, no dropped ceiling) houses that are tunnel ventilated use hanging curtain baffles to direct the airflow for tunnel ventilating. Baffles make tunneling possible, but they also trap valuable heated air when brooding or in the wintertime. Many growers are putting up one paddle fan per bay, centered between each baffle, assuming that the baffles are spaced about 40 feet apart. Fans should be wired on two different circuits so that brood chamber fans can be operated separately from the growout chamber. Fans should normally be hung about three to five feet from the ceiling peak in up-blowing mode to recycle heated air. In some cases growers have found that the down-blowing mode works better for them. However, it is imperative that the birds not be chilled by the down draft of the fans. If you desire to run your fans in the down-blowing mode, then variable speed control must be used to avoid strong drafts on birds. In either case, variable speed control allows adjustment to desired airflow and therefore air mixture. Fans should be operated by an automatic controller if possible and set to run only during the off cycle of the minimum ventilation time period. Fans should be placed on a thermostat located near ceiling and set approximately 5 degrees above bird target temperature, adjusted as necessary during the growout.

High Ceiling Houses with Panel Fans

Because of the baffles that are installed for good tunnel ventilation, it is difficult to use panel fans to set up a race track pattern in a high-ceiling house in the same way this is done in low-ceiling houses. Growers have tried a number of different ways to attack this problem. Especially in cases where unused 36-inch fans were available, some growers have set up these fans on legs or hung on chains horizontally to blow straight up into the peak of the roof. Fans are often located directly below each baffle curtain so that one fan can stir the air on both sides of a baffle (see diagram). These fans would need to be wired with a thermostat, and one 36-inch fan would serve two bays of a house. Since 36-inch fans move a great deal more air than is needed for air recirculation, they should be put on a ten minute timer (in addition to thermostat control) and run as little as one minute out of the ten. For tunnel-ventilated high-ceiling houses where new equipment can be purchased, the paddle fan approach is preferable.

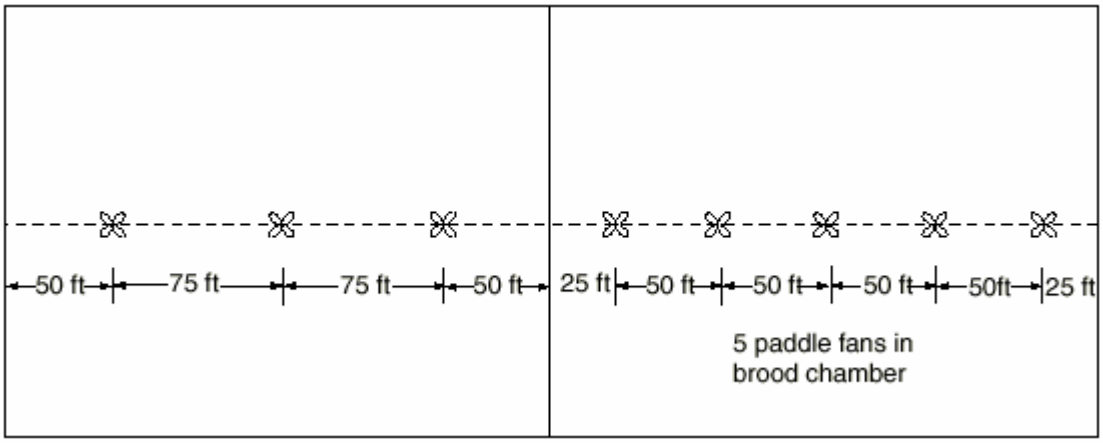
Fan Selection

In the past, some brands of paddle fans especially have not held up well in the poultry house environment. The fans must have high quality bearings to withstand poultry house use. The Underwriters' Laboratories agricultural rating for fans, which includes a spray-test, can be a guide to fan quality. All fans are not equal and the cheapest fan might not be the best value for long term expectations. Do not make the mistake of purchasing fans for your poultry house from a local building supply house. These must be rated for poultry house use. Make sure the fan you buy is rated for the environment in the house.

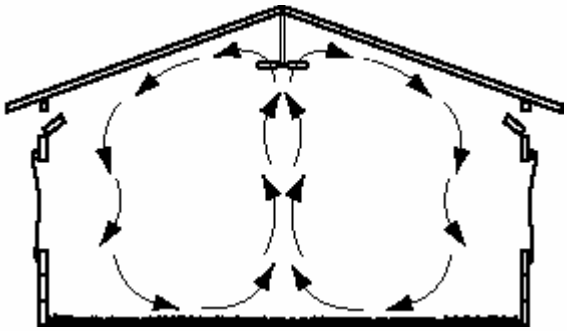
Fan Installation

As with the addition of any electrical equipment, these fans should be installed by a qualified electrician. Fan installation may require additional support in the ceiling to allow for proper mounting.

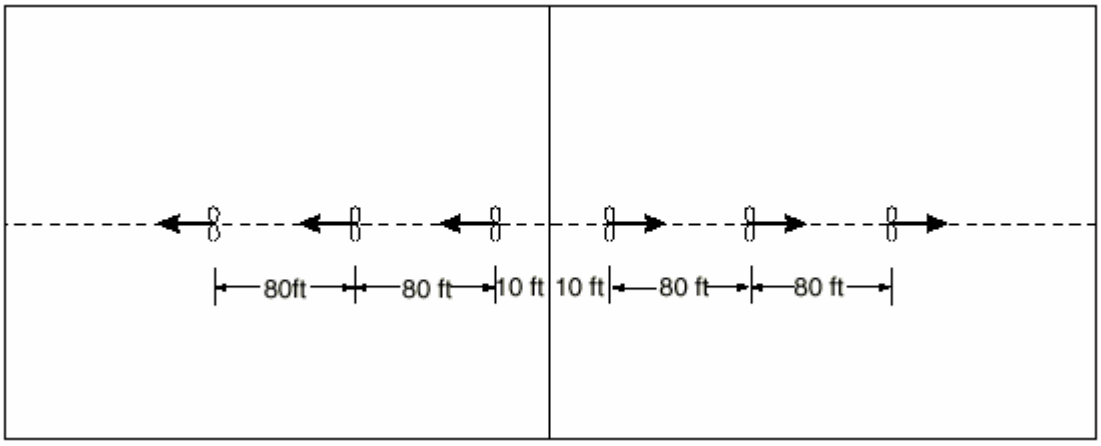
Low Ceiling House with Paddle Fans



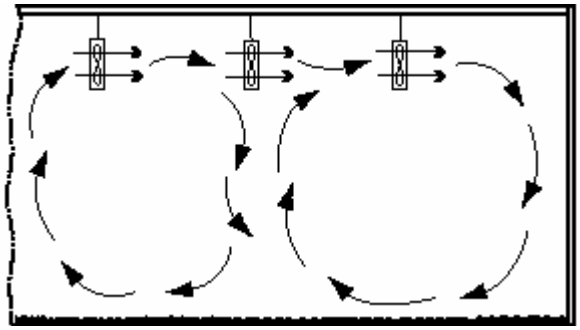
Above notice the layout of ceiling fans using 5 in the brood chamber and 3 in the growout end. The desire is to get circulation of air as shown in the figure on the right. This arrangement has worked well for many growers in the broiler belt. If paddle fans are used in low ceiling houses and are put in the down-blowing mode, too much air can be placed on the birds.



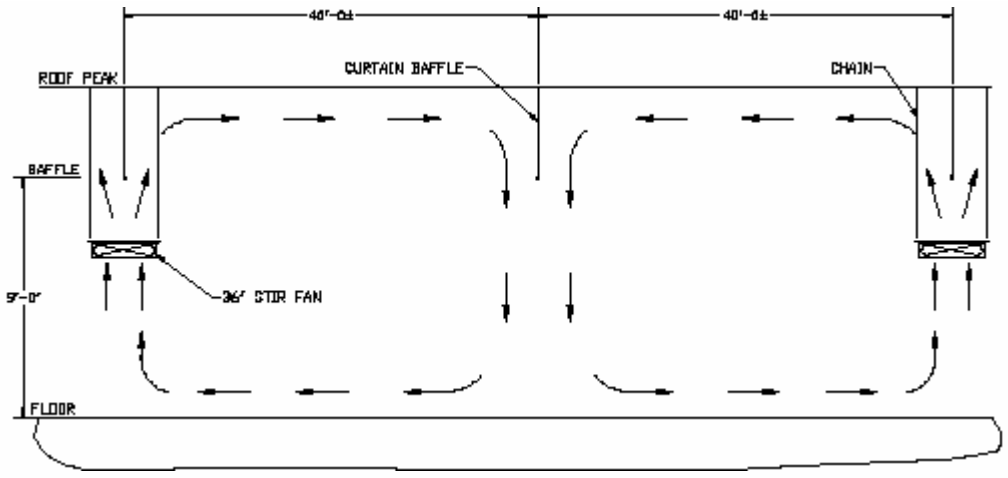
Low Ceiling House with 24-inch Round Panel Fans



Growers with low ceiling houses wishing to utilize 24-inch round panel fans might mount them as shown above. These fans will set up a race track pattern of airflow in the house. When in-between flocks and during catch-out these fans can be winched totally out of the way.



High Ceiling Houses with 36-inch Panel Fans



Some growers use 36-inch panel fans centered directly under the curtain baffles of high ceiling houses to help mix the air next to the roof with lower cooler air. This arrangement is not necessarily suggested but does work for some growers. If this arrangement is used the fans must be put on a 10 minute timer and thermostat.

Typical Installation Photographs

Low Ceiling House with Paddle Fans Installed. On photo at right notice cord and plug connection so that fan may be removed during clean out.

Low Ceiling House with 24-inch Panel Fans Installed. In these photos note the winching arrangement so that the fan may be pulled up out of the way during clean-out and catch.