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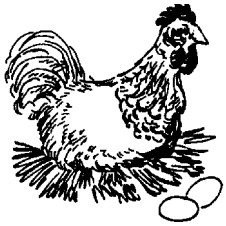

COMMERCIAL EGG TIP...

SELECTING FANS FOR LAYER HOUSES

Often when building a new commercial layer house too little emphasis is placed on the exhaust fan selection. In years past, with smaller naturally-ventilated houses and fans being primarily used for air circulation, this may not have caused any significant problems, but today with 100,000 bird power-ventilated houses in which exhaust fans are used year round to bring fresh air into the house, installation of the wrong fan can be very costly in terms of bird performance and operating costs. If the fans selected do not hold up well under high static pressures caused by dirty evaporative cooling pads and fan shutters, air speed can drop dramatically over the life of the flock causing an increase in heat stress related problems during warm weather. Not paying attention to a fan's energy efficiency rating can cost a producer thousands of dollars a year in excessive electricity usage, and installing a poorly constructed fan can result in needing to replace, or perform major maintenance on a fan after just a few years of use.

When purchasing exhaust fans for a commercial layer house make sure you consider the following factors:
Air moving capacity: Considering that a new 100,000 bird commercial layer house requires approximately 600,000 cubic feet per minute of exhaust fan capacity, it pays to go with an exhaust fan that moves a lot of air. By installing a fan with a high air moving capacity the number of fans required is reduced, thereby reducing the amount of time and money spent cleaning shutters and replacing fan belts. Depending on the fan installed, a 100,000 bird layer house can require as few as 21 or as many as 60 fans. It is important to note that the number of fans required should be based on how much air they move at static pressure of 0.10".

Energy Efficiency Rating (E.E.R): During the summer months when almost all the fans in a house are operating 24 hours a day, electricity costs can easily exceed $1,500 a month. Choosing a fan with a high energy efficiency rating can decrease the cost of ventilating a house by over 35%. A fan's energy efficiency rating indicates how many cfm a fan will move for each watt of power used and typically ranges between 15 and 23 cfm/watt. The higher the number, the more energy efficient

the fan. For instance, a fan with a energy efficiency rating of 20 cfm/watt will use approximately 10% less electricity than one with a energy efficiency rating of 18 cfm/watt.

Air Flow Ratio (A.F.R.): A fan's air flow ratio is an indicator of how well the fan holds up under high static pressure. An air flow ratio of 0.86 indicates that a fan's air moving capacity will decrease approximately 14% as the static pressure increases from 0.05" to 0.20". Likewise, the air moving capacity of a fan with an air flow ratio of 0.41 decreases 59% as the static pressure increases from a 0.05" to a 0.20". The higher the ratio, the better the fan will perform as evaporative cooling pads and shutters become covered with dust.
Construction: Exhaust fan construction quality is difficult to quantify. Some indicators of general quality are thickness of the metal/fiberglass used, length of warrantee, and general reputation.

Cost: Keep in mind that a fan's initial cost is only a fraction of what it will cost over the long run in terms of operating and maintenance. Therefore, spending a few more dollars up front can save thousands of dollars over the life of the fan.

The following table compares four fans which could be used in a commercial layer house with 100,000 birds. As can be seen, there are significant differences in the number of fans required, their air flow ratio, and energy usage. Fan A is overall a very good fan but is not quite as energy efficient as Fan B. Fan D has an excellent air flow ratio, but is not very energy efficient. Fan C is very energy efficient, but does not move a lot of air, therefore increasing the number required. Furthermore, Fan C does not hold up very well under a high static pressure as indicated by its low air flow ratio.

No fan is going to be the best in all categories. When comparing fans look for balance, i.e., a fan that moves a lot of air, with an energy efficiency rating of at least 19 cfm/watt, an air flow ratio of at least 0.70, and constructed so that it will last. After that, start comparing initial cost.

	Diameter	Air Moving Capacity (cfm)	Energy Efficiency Ratio (cfm/watt)	Number Required	Discharge Cone	Air Flow Ratio	Monthly Summer Operating Cost	Construction
Fan A	60"	29,970	19.1	21	Y	.74	$1,420	Fiberglass
Fan B	54"	26,300	20.9	23	Y	.82	$1,250	Steel
Fan C	54"	20,919	19.5	29	N	.41	$1,340	Steel
Fan D	50"	25,300	17.3	24	Y	.86	$1,520	Fiberglass

Michael Czarick
Extension Engineer

County Extension Coordinator/Agent

Consult with your poultry company representative before making management changes.

"Your local County Extension Agent is a source of more information on this subject."