

Maintain fans, save energy

SELECTING energy-efficient ventilation fans can help minimize swine production costs. Likewise, performing routine maintenance on new and existing fans ensures consistent air quality and efficient fan performance.

"Inefficient fans can add to production cost in two ways," says Jay Harmon, Iowa State University professor of ag and bio-



Farm Energy

By DANA PETERSEN

systems engineering, and an Extension ag engineer. "The most obvious is wasted

energy that is expended by an inefficient fan. During summer, poorly performing fans can also lead to increased heat stress, which can greatly impact the growth and productivity of livestock and poultry."

Maintaining adequate air movement is an important consideration for the health of farm employees and hogs alike. This summer, ISU Extension and Outreach

will finish building a new mobile ventilation trailer for its ongoing series of statewide swine ventilation workshops. Demonstrations and workshops will include managing swine ventilation controller settings, maintaining ventilation fans, managing inlets, understanding variable-speed fans and reducing ventilation curtain leaks. Workshops will be planned for fall 2013 and spring 2014.



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Fan performance

Fans are the engine of any ventilation system. Inefficient or mismanaged fans may allow air quality and quantity to diminish, causing undue stress on hogs, says Harmon. Stressed pigs are more susceptible to disease and have less-than-optimal growth and feed conversion.

Installation and ongoing maintenance will affect performance. Regular cleaning and maintenance will keep shutters operating at their manufactured level of efficiency. Well-maintained discharge cones increase efficiency by 15% or more. If belt-driven fans are used, check belt tension and alignment regularly. Loose belts cause the fan to be less efficient and effective, perhaps by as much as 50%. An overtight belt will cause undue wear on bearings.

Guards generally decrease the fan performance less than 5% and should always be left in place, says Harmon. The guards protect employees from fan blades and the fan from obstructions. Shutters may reduce performance about 10% to 20%, but they are needed when the fan isn't operating. Dirty shutters and blades can reduce air delivery by as much as 40%. Fan ratings are based on a fan that is in new condition and should include all accessories that will be used in your building.

Rated efficiency

Fan efficiency is measured based on the amount of air delivery that a fan will provide per unit of electric power used, given in cubic feet per minute per watt (cfm/W). Efficiencies typically range from 5 to 25 cfm/W. Larger fans are often more efficient.

A common mistake is to select fans based on diameter, says Harmon. Never assume two fans of equal size will perform the same since different motors, curvature of blades and other attributes greatly influence the performance. For instance, testing of several 24-inch fans at 0.10 inch of water showed that air delivery ranged from 4,090 to 7,270 cfm and their efficiency ranged from 9.9 to 17.1 cfm/W.

Fans should be rated by an independent lab to show air delivery and efficiency as a function of static pressure. This information is typically presented as a table or a graph. Fan accessories such as guards, shutters and discharge cones impact performance and should be noted when examining test data. Test results are available from the Bioenvironmental and Structural Systems lab at the University of Illinois. See www.bess.uiuc.edu.

If you're replacing fans this spring or starting new construction, ask your electric utility provider about any rebates. Look for more information about efficient ventilation fans from ISU Farm Energy at farmenergy.exnet.iastate.edu and follow @ISU_Farm_Energy on Twitter.

Petersen is program coordinator for ISU Farm Energy.