

Mechanical Ventilating System Maintenance

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Fans are the heart of mechanical ventilating systems; they move air from outdoors to indoors and disperse it throughout the building. Proper maintenance keeps fan and ventilating systems operating efficiently and keeps air flowing through the building. Inadequate maintenance leads to poor indoor environmental conditions and poor energy efficiency because fans run but they do not effectively move or exchange air.

One of the most common kinds of mechanical ventilating systems is the negative pressure or exhaust system where fans blow air out of the building. Outdoor air is brought into a building through fresh air intakes. Air might be heated or cooled, depending on the season, system design, and occupant needs, before it is distributed to the building occupants through inlets. After the air picks up heat, moisture, carbon dioxide, and other contaminants, it is exhausted.

Most mechanical ventilating systems for livestock housing have two or more fans. The fans are staged to turn on and off to provide the minimum (cold weather), mild weather, and hot weather ventilating rates needed to control relative humidity and temperature inside the building throughout the year.

Mechanical ventilating systems behave something like the blood circulatory system in animals. As a heart pumps blood through the lungs and throughout the body, it creates blood pressure. The pressure is created in part to overcome flow restrictions that the blood encounters as it moves through veins and arteries. A fan creates a static pressure difference between the inside and outside of a building to overcome flow restrictions through the fresh air intakes, inlets, and fan shutters and guards. Plugged air intakes and inlets and other flow restrictions reduce a fan's ability to move air and provide fresh air exchange.

Fans have limited airflow and static pressure capacities. Airflow delivered by a given fan decreases as static pressure difference increases. Fans should be selected based on the airflow that is needed and the static pressure that is expected. Livestock facilities should be designed for a static pressure difference between the inside and outside of the facility of 0.04 to 0.1 inches of water.

Recent research by Simmons and Lott (1997) found that 36- inch diameter fans commonly used for poultry house ventilation had as much as a 16% reduction in airflow rate due to dust accumulation after 42 days of use (one broiler flock). If the fan and shutters were used for a second flock without cleaning, the flow rate was reduced by as much as 24%. This is similar to findings by Person, Jacobson, and Jordan (1979). They tested small, well-used fans equipped with guards and shutters. Dirt accumulated on the

guards and shutters reduced flow rates by 23 to 39%. These research results indicate how important it is to clean and lubricate fan shutters to maintain good fan performance and efficiency.

Maintenance recommendations in the *Mechanical Ventilating Systems for Livestock Housing Handbook, MWPS-32* (MidWest Plan Service) suggest that shutters be cleaned every month. Shutter hinges should be lubricated with graphite and not with oil or grease which can get gummed up with dirt. Cleaned and lubricated shutters can open more fully and easily and allow passage of greater airflow.

Most fan motors have sealed bearings and do not need lubrication. Follow the fan manufacturer's recommendations for maintenance of other parts of the fan. Belt driven fans should be checked every month to ensure proper belt tension and alignment. Gable and soffit air intakes should be checked every three months for possible blockage and plugging by dust accumulation. Room inlets should also be checked to minimize blockage and ensure uniform fresh air distribution.

Ventilation is important year-round and regular maintenance will help a ventilating system operate more efficiently and effectively.

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