

## Pre-Season Fan Maintenance

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The hot days of summer are just around the corner and barn fans everywhere will be cranked up to improve the air conditions in livestock facilities. A few minutes of maintenance before they are working hard can improve reliability and electrical efficiency as well as maintain the designed capacity of the fan unit.

One of the first and easiest to do is to clean up the fans as well as air inlets. Dirty fan blades, louvers, and guards can restrict air flow up to 40% and put a larger load on the motor. Restrictions from dirty or partially plugged air inlets will raise the static pressure the fan is working against to draw air through the building. As static pressure rises, the capacity of the fan decreases. The result is less air and more power being consumed.

Dirt in other places can cause problems. Dust covering fan motors tends to insulate them, keeping heat in the motor instead of being removed by passing air. As the motor gets hot, resistance in the motor windings goes up. The motor will then demand more power to overcome this. Besides causing inefficiencies in energy, excessive heat can significantly reduce the life of the motor components, breaking down insulation and increasing wear rates on bearings.

Dirty thermostats also need attention. Dust can build up in mechanical thermostats causing moving parts to stick. Fans can turn on or off at the wrong time or not at all. Blocked air holes on electro-mechanical or electric type thermostats and controllers can cause false readings. Dirty sensors will react slower, possibly causing more fluctuation in temperatures.

Malfunctioning thermostats can cost a producer by lost production, increased health issues, and increased energy usage if fans are running at the wrong times or not shutting off.

A stiff brush will remove dust and dirt from many fan surfaces. Compressed air will get into the hard to reach areas. If cleaning fans while livestock and people are present, brushing off as much debris as possible before using compressed air will minimize the dust floating in the air. Water should not be used for the cleanup of

electrical equipment for safety reasons. Too many times “sealed” motors leak when hit with water resulting in immediate failure or future problems as corrosion sets in the motor housing.

Once the components are cleaned up, they should be given a thorough inspection. Fan blades with loose blades should be replaced before they come apart in operation. Blades should be replaced with the exact same part as was installed on the fan originally. Incorrect parts will change the output of the fan, reducing airflow, overworking the motor, or possibly causing a safety concern if the new fan blades are turning faster than their designed rating.

Damaged guards should be repaired or replaced to insure protection. Loose parts that can get caught by the fan blades should be removed or repaired. Louvers on fans need to be complete and able to open and close easily. Missing or inoperable louver slats can change the air flow patterns from the fan and change airflow rates from optimal to almost non-existent.

Worn and cracked belts should be replaced. A worn belt will ride lower in the pulley grooves, changing the effective drive ratio so the fan isn't operating at the designed speed. A worn belt will also be slipping more if the belt tension hasn't been adjusted to compensate for the wear. Spring loaded belt tensioners help maintain correct belt tension automatically, but other types of tensioners and idler pulleys need periodic adjustment. A slipping belt will decrease fan efficiency quickly, even to the point where no air is flowing. A belt tensioned too tight can cause premature bearing failure on the motor as well as the fan. Belt tension should be set according to the fan manufacturer's recommendations. If multiple belts are used, they should be replaced as a set. If only one belt in the set is replaced, the new belt will be forced to do all of the work as it will ride higher in the pulleys than the old belts preventing the tension to be correctly set to where the older belts, riding lower in the pulleys, won't slip.

All fan motors have bearings. Some can be easily lubricated, while others it is difficult if not impossible. Smaller motors often have oil ports built in. These are identifiable by small plastic plugs in each oil port, one for each bearing. These should be pointing up so that gravity will allow the oil to flow down to the bearing. 2-3 drops of oil rated for electric motors can be put into each port once the port plugs are removed if the motor is turning freely. If the motor is somewhat stiff, 5-6 drops of oil can be added. If the motor doesn't start turning freely, the motor may need the bearings replaced. Motors without oil ports may have sealed bearings. Once these start to stiffen, the only choice is to disassemble the motor and replace the bearings. Heavier commercial duty motors may have grease zerts to get lubrication to the bearings. There should be a relief port to open prior to adding grease. This will allow the new grease to push the old grease out of the bearing as well as preventing grease from being forced through the bearing seals. Using the motor manufacturer's recommendations for lubrication frequency is the safest way to go. It has been shown that lubricating too much and getting excess lubricant inside the motor can do more damage than not using enough.

Electrically, cords and wiring should get checked for cracked insulation and tight connections. Barn conditions tend to break down wire insulation leaving it more prone to cracking and allowing the conductors inside to become bare and exposed. This can create safety issues for a man or animal that comes into contact with this wire. A wire with the conductor being exposed from the insulation being worn off from rubbing against something can quickly become a fire hazard. Where wires enter the motor, they should always be protected with a clamp connector or liquid-tight type of connector to protect the wires from wearing on the opening edges. Corroded or loose connections will increase the resistance in the power circuit, increasing the energy required, and should be cleaned and tightened. Ground wires need to ALWAYS be connected as a matter of safety.

It can be a good investment to have an electrician check the electrical service panel for loading on different circuits as well as for general condition. Making sure there is the correct voltage is the first step. Heavy loads, light wire, poor connections, or wires running long distances can lower the voltage available to circuits. This lower voltage can make the motors require more amperage to satisfy their requirements, which in turn makes them run hotter and use more electricity. The end result is wasted energy and shorter motor life. An electrician can reassign loads to different circuits to reduce the loading on a particular one.

By taking a few minutes to clean and check fans will increase fan efficiency and reduce down time during the high usage times, leaving time to concentrate on other summer activities.