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Critical Information for Improved Bird Performance Through Better House and Ventilation System Design, Operation and Management

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Summertime Tune-up Checklists

By Jess Campbell, Jim Donald, and Gene Simpson, National Poultry Technology Center, Auburn University

We often get questions like, What can I do to be ready for summer? How can I extend the life of my investment? When should I check my electrical system? What should I do first? Checklists are a great way to keep on track and set priorities on servicing equipment and houses. Preventive maintenance is a must to ensure houses are operating at full potential and everything has been done to avoid equipment failures that can cause catastrophic losses. This newsletter provides handy one-per-page checklists you can print and carry with you (or give to helpers), as well as post in convenient places in your office or your houses as reminders and as records to make sure your houses and equipment keep running smoothly. PLUS – see back page for tips on how to be ready for a worst-case scenario if and when it happens.

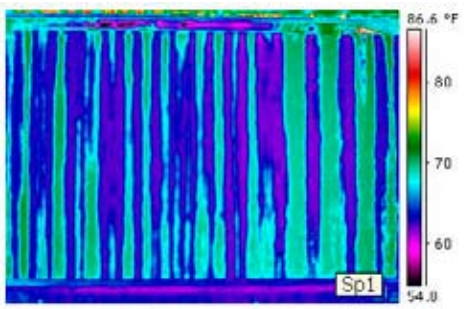

Photo at left shows clogged header holes on a cooling pad causing streaks of unwetted pad (grey) that allow hot outside air to go straight through the pad and into the house. Variations in color in the infrared photo at far left show cold air coming through wetted parts of the pad, and warmer air through the dry streaks.

Water channels in evaporative cooling systems must be kept clean. Dirt accumulation, such as shown here in a recirculating trough, will quickly clog the system, causing loss of cooling.

Infrared photo of a circuit breaker panel reveals one breaker getting dangerously hot. Power failure in summer can quickly cause catastrophic bird losses. An infrared temperature gun is a useful and not too expensive tool to help spot electrical and other problems. Call a qualified electrician when you spot problems like this.

Fan blades, guards and shutters must be kept clean if you want to get the fan performance you paid for. Closeup photo shows how dust and feathers can build up to cause serious obstruction of airflow. All fans should be cleaned at the start of every growout, guards and shutters more often.

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GENERATOR SERVICE CHECKLIST

1. FUEL LEVEL – Check the fuel level in the tank to make sure that you have at least 20 gallons of fuel on reserve in case of an emergency power outage. Maintaining a fresh fuel supply is a must. Fuel filters should be changed each year. Newer fuel mixtures may not have the same "shelf life" as previous fuels so more frequent fuel changes might be necessary.

2. BATTERY – Batteries should be replaced every 3 years regardless of condition. Check all battery connections to ensure that there is no corrosion buildup and all connections are tight. Check the battery charge level to make sure there is a full charge on the battery. Many growers have installed inexpensive trickle chargers on batteries to ensure a full charge when needed.

3. FLUID LEVELS AND AIR FILTERS – All vital fluids must be kept at proper levels. Engine oil must be changed and fluids must be checked at least once per year. Oil, water/coolant, and fuel gauges should be double checked. Air filters must be inspected and replaced as needed.

4. GENERATOR SETTINGS – Make sure backup switch is set to automatically turn generator on or switch to ON when the power fails. Backup "key" switches may be installed so that if electronic or analog generator control board malfunctions occur, the generator can still be manually started.

5. TRANSFER SWITCH – Check transfer switching to make sure it is set to automatically transfer power when the grid power fails. Transfer switch testing must be done at least once a week when the generator cycles on. Most transfer switches have a backup means for transferring power installed in case electronic controls fail. Make sure all farm hands know how to manually transfer power in case of emergency.

6. FEEDER DISCONNECTS – Breakers or fuses must be inspected to ensure proper operation. Exact replacement breakers or fuses must be stored in generator shed in case of emergency.

DATE GENERATOR WAS LAST TESTED AND SERVICED – ALSO RECORD HOURS ON ENGINE:

1. _____ / _____ 2. _____ / _____ 3. _____ / _____

4. _____ / _____ 5. _____ / _____ 6. _____ / _____

<u>GENERATORS MUST BE FULLY SERVICED ONE TIME EVERY YEAR</u>!

GENERATOR SERVICE EMERGENCY CONTACT:

NAME: _____ PHONE #:_____

ELECTRICIAN EMERGENCY CONTACT:

NAME: _____ PHONE #:_____

By Jess Campbell, Jim Donald, and Gene Simpson

226 Tom Corley Bldg, Auburn University, Al 36849 – www.poultryhouse.com – 334.844.3546, fax 334.844.3548

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FAN MAINTENANCE CHECKLIST

1. DRIVES (PULLEYS AND BELTS) - The drives transmit power and provide the gear ratio between the motor speed and propeller speed. Anything that goes wrong with the drive system causes lost fan performance. Check belt tension – loose belts reduce the gear ratio, causing loss of airflow, and reduce belt life. Check belts for wear. Belts riding lower in the pulleys changes the gear ration and lower fan performance. Check pulley alignment. Misaligned pulleys cause excessive belt wear and more drive losses. Check pulleys for wear: cupped out pulleys allow belt (even a new belt) to ride lower in the pulley, which changes gear ratio and lowers air flow.

2. SHUTTERS AND GUARDS - Anything that obstructs the airflow causes lost fan performance. Clean shutters once per week during tunnel ventilation. Dirty shutters require more energy from the airflow to open and reduce airflow and efficiency. Clean guards once a week because dirty guards present more surface area to obstruct airflow.

3. MOTORS - Most electric circuits and electrical devices run more efficiently and last longer at cooler temperatures. Clean motors once per flock. Dirty motors run hotter, lose efficiency and have reduced motor life.

4. BEARINGS - Lubricate bearings twice per year where applicable (Spring and Fall). Dry bearings require more power to turn, causing you to lose fan efficiency and shorten bearing life.

Loose or cracked fan belts, as shown in above photo, can cause lowered airflow as well as threaten complete loss of airflow when the belt breaks. Worn belts or motor pulleys are often overlooked, and will cause lowered fan rpm's and reduced house air flow.

Worn fan belts ride low in the motor pulley, as shown in top photo above. Result: blade rpm's are greatly reduced, thus robbing cfm's, air speed and wind chill cooling. Belts should be tight and ride high in the motor pulley, as in bottom photo, to achieve maximum fan rpm's and best wind-chill and evaporative cooling. NOTE: The same effect is caused by a worn pulley, even if belt is new. Retensioning the belt will not cure either problem, worn belt or worn pulley.

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ELECTRICAL SYSTEMS CHECKLIST

1. MAIN PANEL – Main panel breaker must be checked on a weekly basis during the summertime to make sure it is not overheating. Breaker spots can be installed on both sides of each main breaker to help spot early warning signs of trouble. At least one exact replacement main breaker should be stored on site preferably in a common location on the farm site.

2. CONTROLLER BACKUP – Check that controller backup system is set to turn on automatically if controller fails. Make sure that if controller fails, siren and dialer operate properly. Make sure backup batteries have been installed in dialer or backup controller box.

3. BACKUP THERMOSTATS – Test backup thermostats for proper operation and temperature setting. Placing backup thermostats near cooling systems is not recommended.

4. CIRCUIT BREAKERS – Check to make sure breakers are not overheating or tripping. Problem may be in the electrical system or the breaker itself. Make sure exact replacement circuit breakers are readily available. If replacing the breaker does not solve the problem, get a qualified electrician to troubleshoot the system.

5. ELECTRICAL CONNECTIONS – Electrical connections in transfer switches, generators, service disconnects, and main panels/subpanels should be checked and tightened every year. This should only be done by a qualified and/or licensed electrician. Damaged fan outlets, equipment outlets, light fixtures and junction boxes are fire hazards and must be repaired!

6. GROUNDING LUG – Grounding lug on ground rod should be checked for tightness at every house and generator shed. This is done by moving wire at lug-to-rod connection. Solid acorn style grounding lugs are recommended to tie ground wire to ground rods.

7. LIGHTNING PROTECTION – Check to make sure lighting protection is in place and properly installed. Lightning protection works best when installed in layers to protect major electrical and electronic components. Protection systems must be sized to protect the equipment it is intended to protect. One-size fits-all is not the best way to go. Lightning protection must only be installed by a qualified or licensed electrician.

ELECTRICAL INSPECTIONS SHOULD BE DONE EVERY YEAR!

ELECTRICIAN EMERGENCY CONTACT:

NAME: _____ PHONE #:_____

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226 Tom Corley Bldg, Auburn University, Al 36849 – www.poultryhouse.com – 334.844.3546, fax 334.844.3548

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EVAPORATIVE COOLING CHECKLIST

1. PADS – Blow debris from outside of pad system to dog house with backpack blower with pads dry. This will push all debris and cobwebs into dog house to be later removed. If pads are damaged they must be replaced.

2. DOG HOUSE – Sweep all cobwebs and other debris off of the back of the pads with a broom. Once everything is on the floor, remove it from the dog house.

3. PAD RINSE – Close inlet curtain or tunnel doors. Wash excess debris from pads with water hose and spray nozzle carefully. High pressure washer rinsing is not recommended. Wash anything left inside dog house out. (If pads require a chemical cleaning use only recommended chemicals and cleaning procedures.)

4. DRAIN SYSTEM – Drain the evaporative cooling system recirculation trough and sump tanks and clear all dirt/debris from the system. Leaving trash in the system causes premature fouling of filters pads and pumps.

5. FLUSH SYSTEM – Flush the top header system and the trough to the best of your ability.

6. FILTERS – Remove and clean or replace filters. Replacement filters must be stored on site and be readily available when needed. Filters must be checked once a week at times of high use. Do not operate system without filters and screens in place.

7. PUMPS, FLOATS & TANKS – Make sure pump intake screens are cleaned, floats are in place and adjusted and tanks are clean and free from debris. Pump screens must be checked at least once a week during periods of high use of cooling system or as often as system is drained and flushed.

8. WATER SUPPLY – Test run recirculation system to make sure the fill levels are adjusted properly and adequate water is available to fill system. Make sure the supply system fully wets the entire pad system and no dry streaks are left on pads. If water quality problems surface additional filtration or treatment may be necessary.

9. DISTRIBUTION HEADER – Flush distribution header. Loosen union at distribution header and carefully clean all distribution holes in header with screwdriver or soft bristle brush. Do not change the size of the hole in the header. Run water in system to ensure all holes are free from debris or clogs.

10. INLET OPENING - Inlet curtain opening must be at least a minimum of 80% of the area of the cooling pad system area. 600 square feet of 6-inch recirculating pad requires at least 480 square feet of free air unobstructed inlet opening minimum. Bunched up curtains or partially opened tunnel doors must not restrict the tunnel inlet opening!!

11. DOG HOUSE TIGHTNESS – The dog house on each side must be as air tight as possible. A little spray foam and carpentry work will go a very long way. All cracks, holes, and leaks must be sealed. Air that bypasses the recirculating pads is not cooled and works against the system.

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What if the worst occurs?

Even the best preventive maintenance and loss prevention plans occasionally fail. Stuff Happens. When the worst occurs and a massive mortality happens due to an electrical failure or other unexpected breakdown and mortalities must be properly disposed of immediately, a well thought out plan of action should be implemented. The key to a well thought out catastrophic loss disposal plan is to have a planned-out site on the farm to bury between 30 and 70 tons of mortalities immediately.

NRCS and most state agriculture officials encourage pre-planning and some require pre-approval of a burial site that meets groundwater, drainage, and other pertinent environmental considerations. Growers are strongly encouraged to locate that site on their farms with the help of the NRCS and the state officials. Prior planning and approval if required helps streamline the process should the worst happen. To dispose of 70 tons of farm mortalities requires lots of back breaking work and it must be done in a short period of time for biosecurity reasons. There is no time to get approval!

The Bottom Line

Let's do the economics on the cost of a loss of a house of birds. If a 40 x 500 house loses 22,500 birds at 6.5 lbs the day before catch, that is 146,250 pounds of meat. This over 70 Tons of mortality must be picked up, removed and disposed of immediately. The loss to the grower might be about $7,700 at .055 grower pay.

Company losses might be in the $1.80 per bird range. The value of the loss to the company could approach $40,000.

Catastrophic losses will cause the grower and his family to experience severe mental anguish. The grower had to pick up and quickly dispose of over 70 tons of mortalities, had to put other work aside in order to troubleshoot, repair, and test his backup systems, and face delays in getting the next flock in the house. Being ready for the catastrophe won't eliminate all the economic losses, but it will help minimize both the losses and the degree of anguish involved.

Using checklists and doing everything possible to help prevent losses is very important – and, according to this example, well worth the time. We hope these checklists help remind you of what needs to be done before the weather really turns hot.

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The Poultry Engineering, Economics and Management Newsletter provides up-to-date information on topics of interest to poultry production personnel, focusing on most effective and efficient uses of modern technology and equipment, with a special emphasis on economic implications. The Newsletter is published six times a year, or as needed to address emerging or special issues. Contact: Jess Campbell, National Poultry Technology Center, 226 Corley Bldg., Auburn University, AL 36849-5626, (334) 844-3546, fax (334) 844-3548, jesscamp@aces.edu. Published by:

Jim Donald, Professor and Extension Engineer

Jess Campbell, Program Manager, National Poultry Technology Center

Gene Simpson, Professor and Extension Economist

Kenneth Macklin, Assistant Professor and Extension Poultry Scientist