COOPERATIVE EXTENSION
UNIVERSITY OF DELAWARE
College of Agriculture & Natural Resources

Applied Poultry Engineering News

Generator and Transfer Switch Maintenance

Vol. 2 No. 2 April, 2004

With the advent of electronic controllers, evaporative cooling systems, solid wall houses, tunnel ventilation and light dimmers; today's poultry house is quite extraordinary. While all of the above are technological advances, our poultry houses are more dependent than ever on a continuous supply of electricity. Standby power equipment that allows poultry houses to operate during a power loss has become standard equipment on poultry farms to prevent a catastrophic loss of birds and income. Growers must maintain this equipment or it will fail when it is most needed.

Standby Power System Components

An automatic transfer switch and generator are the main components of a standby power system. They will monitor the supply of electrical power to the farm, and if there is a loss of power, the automatic transfer switch will start the standby generator and transfer the farm to generator power. Once power from the electric company is restored to the farm, the transfer switch will retransfer the farm to the power company and the generator will turn off after a brief cool down period.

Know Your Service and Equipment

Automatic Transfer Switch

Do you know where your transfer switch is located? Very likely it is in the building that houses your generator. Once you've found your transfer switch, determine the manufacturer, model number and style of the switch. You can find this information inside the switch housing or printed in the owner's manual. You will need this information in the event your transfer switch doesn't work and you are required to operate the switch manually. A switch failure could occur if the switch is damaged by a large power surge (i.e., lightning strike). You must be prepared to operate the transfer switch manually. If you have questions, contact a qualified electrical company or generator company for one-on-one training. Taking the time now for this training could save a flock of chickens. You have already invested in standby power equipment; it is only logical to learn how to use it properly. Once you have found

reliable service personnel, ask for their business card and their emergency phone numbers. Tape this information inside your transfer switch so when an emergency arises, help will be a phone call away.

Interior of typical automatic transfer switch.

Assuming you have found your transfer switch, notice whether it has switches, lights, a screen or buttons located on its cabinet or door. Learn the purpose of these devices. Label them to clearly define their purpose. Is there a switch or button that can be activated to test the generator for automatic operation? Your generator should be set up for a weekly test run. If it has been properly set, has the weekly test occurred? If this test has not occurred you need to determine why not. This could indicate a problem with the transfer switch or generator.

The Generator Unit

Determine the manufacturer, model number and rating (kW) of your generator. Does it have a 4 or 6 cylinder motor? What type of fuel does it require? Who manufactured the motor? The motor and generator usually have different manufacturers. You will need this information when you have a problem and call for service.

A generator consists of systems that must work together for proper operation. These systems include the cooling system, fuel system, the battery and charging system, the engine, and the generator and its controls.

Cooling System

The cooling system consists of a radiator, antifreeze, a block heater and a water pump. The radiator should be inspected monthly to see if its fins have become blocked with dirt or chicken debris. Make sure the generator is OFF prior to inspecting by shining a light through the front of the radiator. If the light doesn't shine through the fins, carefully clear the blockage. Antifreeze level should be checked weekly. Inspect hoses for signs of wear, bulges, cracking, and leaks. Check hose clamps for tightness. Examine the block heater to determine if it is at least warm to the touch. If not, check if it is plugged in. Block heaters should be plugged in all year long. Using a block heater reduces wear of the generator's motor. Examine the water pump for any leakage and its belt for wear.

Fuel System

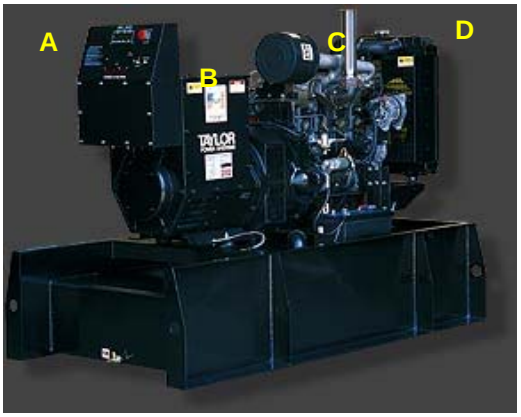
The fuel system consists of a fuel tank, filters, fuel lines, hoses, lines to the unit from the tank, fittings, regulators and fuel additive. Make a visual inspection of the fuel system components for wet spots around fittings. Fuel filters on a diesel engine should be changed every year.

Battery and Charging Systems

Check the connections at the battery and starter to ensure they are tight. If there is corrosion on the terminals they should be cleaned. Make sure the battery charger is turned OFF before working on the battery or starter. Check your battery charger to see if the charging gauge or indicator light is reading "OK". If your battery is not "maintenance free", you should monitor its water level once a month. Batteries over 4 years old can fail or become weak. Be safe and replace the battery before it fails you.

The Engine

Inspect the engine for leaks and wear marks. Check the oil level. The engine oil and filter should be changed once a year. Examine the air filter; is it dirty or does the filter canister contain dirt, feathers or other debris? Belts should be checked for signs of wear, cracking, splitting or looseness.



Diesel generator with (A) controls, (B) generator, (C) engine and (D) radiator.

<u>The Generator and Controls</u>

A generator needs to breathe. Make sure air can freely move around the generator housing. Avoid storing items around the generator that could block air flow. Examine the controller on your generator noting whether it has gauges, dials, buttons or fuses. Learn how to start your generator manually. If you are not sure how to do this, call an electrical contractor to show you how it operates. If your controller contains fuses, determine their size, type and voltage. Purchase extra fuses to have on hand in case of a breakdown. It is nearly impossible for a service technician to stock all the different types of fuses used on generators. Your generators down time could be shortened if you have the correct fuses.

Generator Maintenance is Important!

As with most maintenance chores around a poultry farm, generator maintenance always seems like something you'd rather do tomorrow. Remember, your generator is your only line of defense when you lose power. A generator usually doesn't have a backup. **A lack of generator maintenance will result in generator failure.** After investing in a standby power system, is it worth losing a flock of chickens and the resulting income, then having to dispose of houses of dead birds? A small investment in maintenance and preparation today can save a lot of problems.

This article was written by Tim Norman and was presented at a Flock Supervisors Conference sponsored by the University of Delaware. Mr. Norman is employed by Barnes Power Generators, A Division of Barnes Electric, Inc. Rhodesdale, MD. Barnes Electric is one of several fine electrical contractors serving the Delmarva poultry industry.

Poultry Research Profile

Poultry Behavior Analysis System Using Machine Vision

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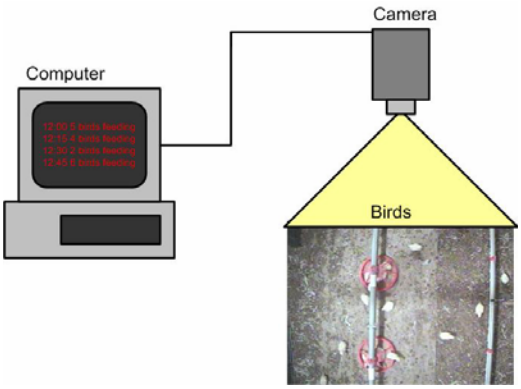
Experienced poultry growers can adjust the house environment and equipment based on observing bird behavior. In today's industry with farms having a greater number of larger houses and high tech specifications, growers don't have the same time they once did to make adjustments by observation. Many growers rely on electronic controllers using temperature and pressure set points to control the house environment and equipment. Wouldn't it be great to have a set of eyes in every house 24 hours a day, 7 days a week for observation without actually having a person present to distract the chickens?

This project uses new technology, a machine vision system, to learn more about chicken behavior. A machine vision system uses a combination of cameras and computers to observe and then determine what the birds are doing. Unlike using a video camera and analyzing videotape, a vision system camera is linked to a computer and software that analyze images provided by the camera. In the past, some researchers have used videocameras to evaluate bird behavior, however, with a videotape, someone has to later review the tape. With the system under development, a computer analyzes the results and determines what the birds are doing.

UD engineers are developing a system to evaluate feeding, drinking and temperature response. A security grade camera is mounted over the feeder and drinker lines, allowing several feeders to be viewed at once. One objective of this research is to learn how often and how long birds spend eating and drinking under different conditions. Another goal is to analyze

images for chicken's response to different house temperatures. While this sounds simple, software analyzing these images has to separate birds from bare floor, single birds from groups of birds, birds from objects like feeding and drinking equipment and then discern birds eating and drinking from birds that are not.

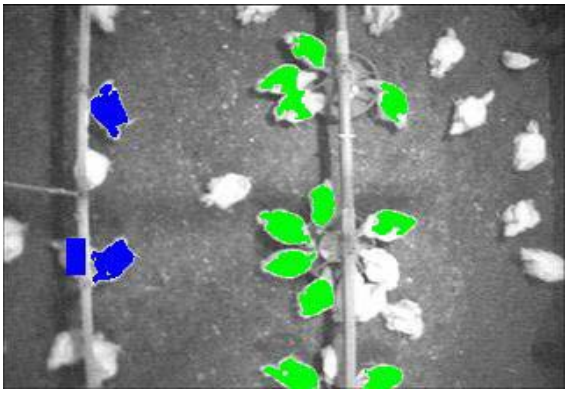


A security camera installed in the house captures an image of bird activity. The computer located in or near the house classifies the behavior based on proximity to feeder or drinker lines.

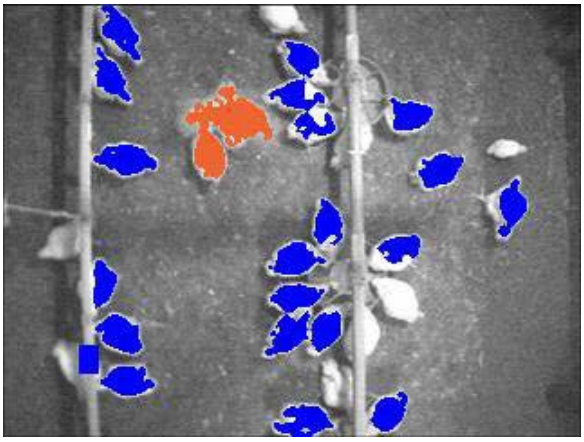
The current systems have a limited field of view. Poultry houses are wide and long compared to their ceiling height, which restricts how much a single camera can view. Engineers are currently exploring options that could include multiple cameras or a track system to move a camera through the house.

The project is in the early stages and has largely used images collected over four flocks at the UD Research and Education center in Georgetown DE. This winter, prior to the AI outbreak, additional images were collected from more typical conditions in a commercial house.

The algorithms developed can currently collect images at regular intervals (for example, every 15 minutes) and analyze them. The algorithms can count the number of birds feeding and drinking, which can allow for an analysis of feeding over time.



An image showing birds at one portion of a feeder line and a drinker line. Birds in blue were correctly identified as drinking. Birds in green were identified as feeding. In both images, however, some birds were not correctly classified.



In this image, the birds were separated from the background. The birds identified in red were clustered together away from a feeder. Clustering away from a feeder can indicate that the birds are cold.

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