Poultry Science | Capital Region | Veterinary Science

Penn State

Poultry Pointers

Entomology | Food Science

Agricultural & Biological Engineering | Agricultural Economics

STRAY VOLTAGE ON POULTRY FARMS

Paul H. Patterson, Ph.D.
Assistant Professor
Poultry Science

Poultry producers may be concerned about stray voltage (or neutral-to earth-voltage) and how it may be affecting the health and production of their birds.

Stray voltage is a small voltage (less than 10 volts) measured between two points that can be simultaneously touched by a bird. This could be between the floor of a laying cage and a nipple drinker, or the feed trough and slat floor in a breeder house.

Birds really respond to the current produced by a voltage and not to the voltage directly. More cases of stray voltage have been traced on dairy farms, but poultry farms are not immune to this problem.

One of the early cases documented in Pennsylvania was a 43-week-old laying flock in Erie County. Feed consumption dropped from 23.3 pounds/100 birds to 15.6 pounds/100 birds and remained at this level for four days. Egg production dropped from 83 percent to 45 percent between 43 and 45 weeks and mortality increased from a monthly rate of .7 percent to 1.7 percent for that four-week period.

voltmeter readings taken between the cage and water in the cups showed .8-.9 volt. Voltage potential between the cage and a ground line driven into the earth was 1.3-1.5 volts. Readings at the entrance box (secondary ground) indicated that the voltage was coming from the power company's neutral. The power company took corrective action and reduced the voltage between the cage and water cup to .2-.3 volt. Installation of a water meter immediately thereafter showed normal water consumption and feed consumption and egg production returned to normal.

An investigation this summer of a suspect case of stray voltage in a breeder flock of Leghorn hens located in southcentral Pennsylvania revealed from 0 to 2.0 neutral to ground volts at the service pole entering the farm. This was later corrected with a neutral isolator by the power company. Further investigation revealed an uninsulated electric fence around the feed hoppers secured to the wood slat floor that continued as a shock line above the water line.

According to the producer, the flock had been experiencing some type of emotional distress, and were "rushing" back and forth within the pens. Mortality was elevated and had been traced to egg yolk peritonitis.

Prior to installing the neutral isolator, voltage readings taken from the water line to the damp slat floor read between .3-2.2 volts with the shock line turned off, and from 17-70 volts with it on! Feed trough to floor readings were .2-1.7 and 3-14 volts with the unit off, and on, respectively.

Surprisingly, no drops in feed or water consumption, egg production, fertility or hatchability could be documented by the producer or hatchery. To date, the flock remains nervous and rushes despite correction of the problem.

Another case involving turkey poults was reported by University of Minnesota researchers in the journal, Avian Diseases. Three successive flocks of poults experienced cumulative mortality of from 10 to 26 percent through the fifth week of rearing. Stray voltage was suspected after no definitive laboratory diagnosis could be made, and no management deficiencies were found. Alternating current voltages of .2-2.5 volts were detected between waterers and the floor and between the water line and gas line. When the water line was equipment-grounded to the electrical service entrance, the subsequent flock had no mortality problem.

According to the dairy literature, the voltage necessary to deliver currents that would elicit a response depends on the body impedance or resistance of the cow. This would include the contact impedance between the cow and the conductive structure and any impedance of the structure and the impedance of the voltage source.

For cattle, a very conservative estimate for a worst-case total impedance is 500 ohms. A more realistic estimate of total circuit impedance is 1,000 ohms. Older recommendations for tolerable levels of cow contact voltages were .5-.7 volts based on the lowest values of perceived current and low values for body, contact, structure and source impedance's.

Recent research indicates that current levels below 6 milliamps have no direct effect on production, reproduction, or animal health, although some behavioral changes are seen in cows exposed to currents between 3 and 6 milliamps. Based on these estimates for impedance and current, the more realistic voltages that may elicit a response in cattle might be between 1.5-6.0 volts. Threshold voltages based on body, contact, and total circuit impedance for poultry have yet to be determined.

Pennsylvania Power & Light Co. (PP&L) has summarized their research and experiences into some of the main causes of stray voltage. These include:

- Short circuits in wiring and equipment.
- Improperly grounded equipment.
- Improper interconnection of ground and neutral wires in equipment wiring.
- Fault currents through poor insulation or damp, dirty electrical equipment.
- Unbalance of load on 120-volt circuits on the farm system.
- Induced voltages on equipment.
- Low voltages carried on the electric utility's neutral.

It is essential for producers who suspect they have a stray voltage problem to promptly investigate and take the necessary corrective actions. PP&L recommends the following five steps be taken:

1. Record signs of flock disorder.
2. Consider all other possible causes for these problems (your county cooperative extension agent, veterinarian, or other specialist could review your feeding and management programs with you).
3. Consult with specialists and examine the farm's electrical system.
4. Have a qualified electrician correct all on-farm electrical problems.
5. Contact PP&L for any assistance along the way.

Tax Week At Penn State Dec. 6-10

HUNTINGDON (Huntingdon Co.) — Accountants, attorneys, and other professionals who prepare tax returns for businesses and individuals will converge on Penn State's University Park Campus the week of December 6.

More than 300 tax professionals are expected to attend the 41st annual Tax Week at Penn State, which will be held at the Days Inn Penn State. The week-long program features a combination of technical tax topics and special interest workshops to help tax professionals better serve their clients.

Topics to be discussed Monday and Tuesday of Tax Week include the new tax law, employment taxes, small business tax issues, and basic rules for preparing individual income tax returns. The program also covers Pennsylvania state income tax preparation and helping clients survive an audit.

Daniel J. Pilla, a nationally known tax litigation consultant and author of five books about representing taxpayers before the Internal Revenue Service, will be the featured speaker on Tuesday, December 7. He will discuss how professional tax preparers can protect their clients' interests. His address will be followed by a question-and-answer session.

Wednesday will be devoted to tax rules that apply to organizations exempt from federal income tax, including charities, educational groups, and service organizations such as volunteer fire associations. Topics to be discussed include applications for tax-exempt status, filing forms required once an exempt status is attained, and special rules related to charitable fund raising.

A two-day estate and Gift Tax workshop, to be conducted on Thursday and Friday, concludes Tax Week at Penn State. This program will detail the tax aspects of estate transfer, the rules for completing the estate and gift tax forms and techniques that may reduce estate or gift tax.

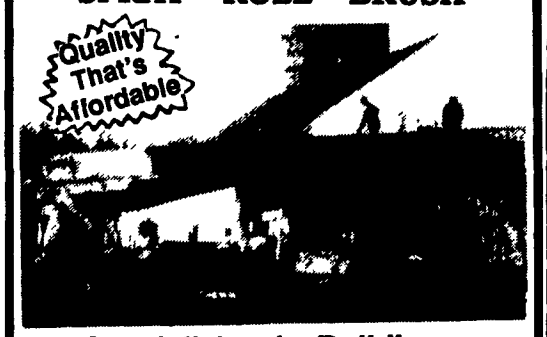
Dr. William Kulsrud, associate professor of accountancy at Indiana University at Indianapolis, will teach the estate and gift tax workshop. His 250-page workbook about estate and gift taxes will be distributed to all participants in the workshop.

Participants can register for the entire conference or for only those sessions of interest to them. Registration fees and the number of continuing professional education (CPE) credits participants receive depend on the number of sessions attended.

Additional information about Tax Week at Penn State and a registration packet are available from the Tax Week Coordinator, The Pennsylvania State University, 8 Armsby Building, University Park, PA 16802; (814) 863-4580.

B&B SPRAY PAINTING SANDBLASTING

SPRAY - ROLL - BRUSH



Specializing In Buildings, Feed Mills - Roofs - Tanks - Etc., Aerial Ladder Equip.
Stone - Brick - Restoration
574 Gibbon's Rd.,
Bird-In-Hand, Pa.
Answering Service (717) 354-5561

• Agricultural • Commercial • Residential

Commodity Bins And Trench Silos

• Retaining Walls • Bunker Silos • Manure Storage, Etc.

LET OUR EXPERIENCE WORK FOR YOU-
ESTABLISHED SINCE 1979!
WE ORIGINATED THE CONCRETE SYSTEM!

Sizes And Layouts To Your Specifications

We Work Hard For Customer Satisfaction!

Authorized Dealer For KEYSTONE CONCRETE PRODUCTS

- Hog & Cattle Slats
- H-Bunks
- Trench Silo Walls
- J-Bunks

GROFFDALE CONCRETE WALLS INC.
430 Concrete Ave., Leola, PA
717-656-2016