

## 2004-Undergraduate Student Project Description

### Department of Bioresources Engineering

**Project Title:** Activation Force Measurement and Component Testing of Poultry House Drinker Valves

**Faculty/Staff Sponsor:** Gary Van Wicklen and James Glancey

**Area of Study:** Fluids/Hydraulics

#### **Project Description:**

Background: Nipple drinkers have become standard equipment in most poultry housing. They are very useful in maintaining drier litter that in turn reduces ammonia generation. Although nipple drinker valves have a minimum of parts and are of simple design, there are subtle differences in materials and design between different products. Sometimes these differences between products can cause problems with use over time. One such problem is that as some nipple valves wear over time, it becomes more difficult for birds to obtain the desired amount of water. Some integrators have mandated that growers change from their present nipple type to one that is more effective. While this seems like a reasonable request with the cost of a nipple valve at \$0.80 each, when there are roughly 2000 nipples per 500 foot-long house, total nipple replacement can cost a grower in excess of \$1600 per house! Integrators and growers need information regarding the activation force needed for birds to get water from a given nipple valve. This information should be provided for “used” as well as new nipple units. Identification of component wear inside the nipple valve (metering pin, shut off ball, seat and trigger pin) would help formulate improved product design.

Proposed Research: Nipple drinker valves will be mounted in an Instron Universal Electro-mechanical Test Machine in a laboratory at the University of Delaware. The force needed to release water from the drinker valve will be determined. Both new and used product will be tested. Units will be disassembled and valve components measured to quantify wear. The amount of water released for each valve tested will be measured. Testing will be done over a range of water pressures. The student researcher will be responsible for fabricating a test fixture, conducting the tests, and analyzing the experimental results.

Intended Benefits: This research will provide growers and integrators reliable, impartial data on the activation force of nipple drinker valves. It will allow growers information from which to select among different products. Proper initial selection of nipple drinkers may save growers the significant cost of replacement later. This data may be valuable to manufacturers and instigate improvements in materials and designs used.

Students can work for credit or pay.

**Student Qualifications:** completion of EGTE215