

A CASE STUDY OF TEMPERATURE UNIFORMITY IN LAYING HEN PRODUCTION BUILDINGS

Thomas H. D'Alfonso
Research Scientist
Automated Environments, Inc.

Harvey B. Manbeck
Professor
Ag & Bioengineering
Penn State

Even when the average temperature in a livestock production house is "on target," regions within the building may be far above or below desired temperature.

Best Buys in Used Equipment

TRACTORS

IH 3588	(2) IH 966	CIH 7130
IH 4568	JD 4020	(3) CIH 7110, 2WD
(2) IH 4366	JD 4840	(2) CIH 7120, MFD
IH 1486	JD 2550	(2) CIH 9270
IH 1086	Case 2290	Farmall M
(2) IH 1066	Case 3294, MFD	Ford 5000
IH 5288 MFD	Case 1270	AC WD45 w/Loader
IH 706	Case 4890	
(2) IH 806	Case 2670	
IH 464		

DISCS

KR 1577 16'8"	IH 490, 21'	Midland 1050, 26'
KR 1927 25'	IH 470, 18'	JD 430 12'
KR 4907 25'	IH 496, 25'8"	MF 520 16'
KR 4927A	IH 496, 27'6"	MF 820, 26'
KR 1965	IH 490, 23'	MF 620
KR 1966	IH 475, 18'	

COMBINES

(2) Case IH 1480	(2) IH 1480	JD 4400
(3) Case IH 1680	IH 915	JD 8820
CIH 1640	(2) IH 1420	AC F
CIH 1644	(3) IH 1460	ACM
CIH 1660	(3) JD 7720	NH TR85

CHISEL PLOWS

DMI Tiger II Sub-Soller 7 Shank	SF HB 30 Chisel Plow
DMI Tiger II Sub-Soller 5 Shank	BR 16' Chisel Plow
JD 910 sub-Soller, 13 Shank	Athens 156 Chisel Plow, 3 Pt.
(2) Sunflower 21' Chisel Plow	10' & 12'
IH 55 chisel Plow, 13 Shank	Ferguson 9 Shank Chisel Plow
Stieger 2211, Slicer chisel, 14'	

PLOWS

Case 400, 8'18"	IH 560, 6 Btm.
IH 510	IH 720, 6x16
IH 531, 3x14	IH 800, 10 Btm.

MISC. TILLAGE

KR 3131 Landsman	BR 25' Cultimulcher
KR 3921 Fld. Cult.	BR 34' Packer
KR 3121 Landsman	BR 25' CF Packer
KR 4612 F-3 Fld. Cult.	Sunflower 17' land Finisher
IH 45 Fld.-Cult, 18' 22'	Bervac 615 Fld. Cult.
BR 16' CF Packer	UM 31' Rolling Baskets
BR 14' Packer	Landoll Tillall 875
BR 14' Culti-Mulcher	Landsman

DRILLS

GP 12'	JD 8300	IH 5100 21x7
GP 24'	w/Cultiplanter	w/cultiplanter
(3) GP 15'	JD 750, 15 Ft.	CIH 5400
GP 20'	(3) IH 5100 Drill	w/Cultiplanter, 26x7
(2) GP 30'	IH 510	CIH 5300
JD 8000 23x7	21x7, 24x6	(3) MF 43, 22'

MISCELLANEOUS

AC 600 Planter, 18'	Woods 15' Batwing Mower
JD 7200 16x30 Planter	NI 323 Corn Picker, 1 Row
JD 71 Bean Planter	Badger TA54 Blower
NH 1499 Haybine	Berthoud D6 Sprayer
NH 575 Baler	Gehl 1865 Rd. Baler
NH 2000 Baler	UFT 400 Grain Cart
Schulte 5026 Rotary Cutter	Kinze Grain Cart
26'	

HOOPER
HOOPER EQUIPMENT INC.
MIDDLETOWN, DE

(302) 378-9555 1-800-341-4028

1994 CASE CORPORATION
Case IH is a registered trademark of Case Corporation

CASE IH

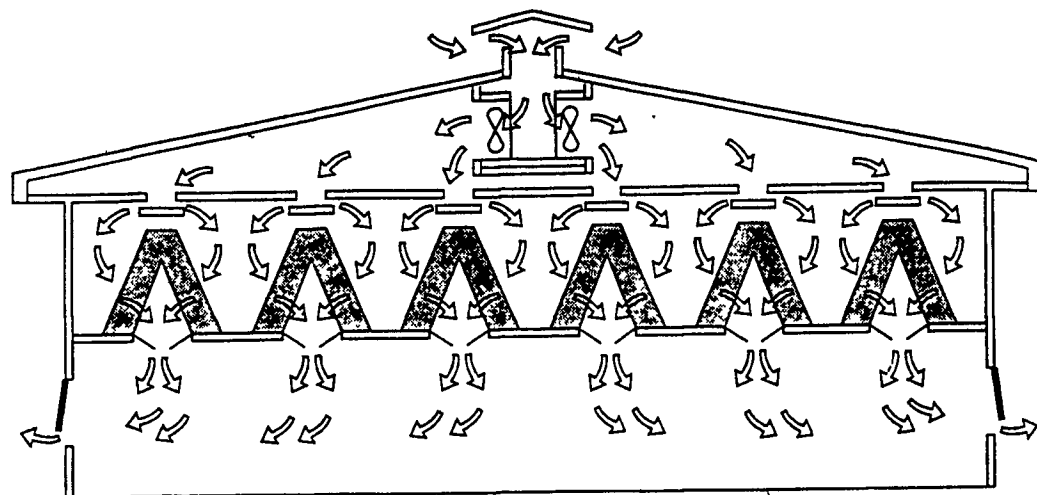


Figure 1. Transverse cross-section of Turbo Positive™ house.

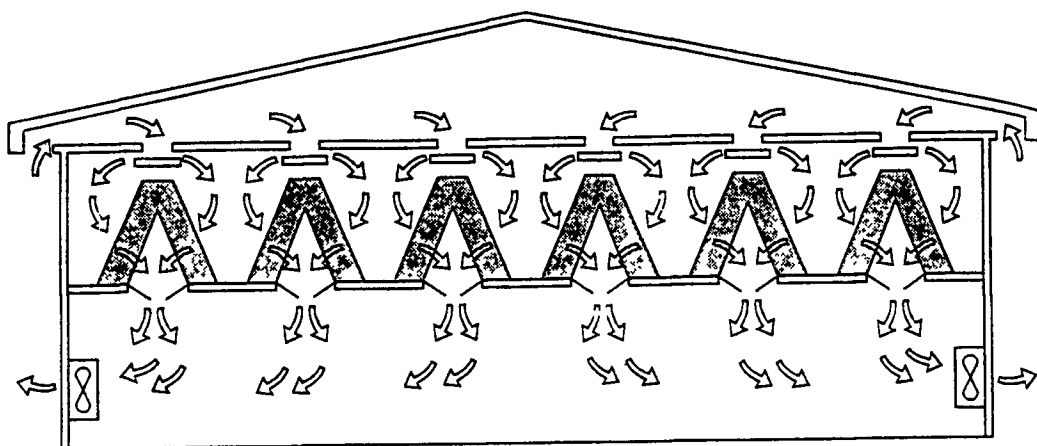


Figure 2. Transverse cross-section of Turbo Negative™ house

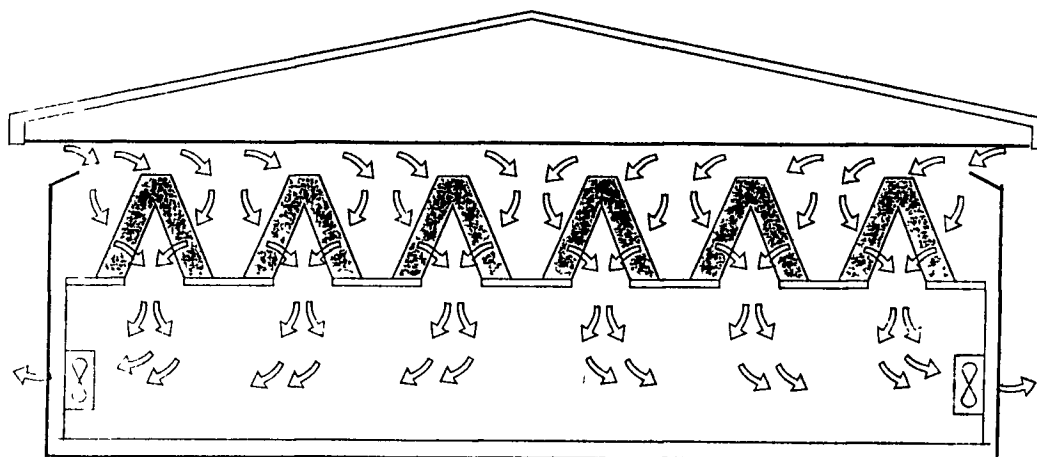


Figure 3. Transverse cross-section of perimeter baffle house.

Research at Penn State investigates why temperature and other air quality factors are not uniform within laying hen production houses.

Depending on the building design and the environmental control system, air flow, airborne particles, and temperature that one group of birds experiences can be greatly different than that experienced by birds in a different region of the house.

Environmental conditions affect production, feed intake, behavior, and health. Nonuniformity of environmental conditions prevents the entire flock from producing to its genetic potential and therefore reduces the farm's profit potential.

In an effort to understand more about temperature uniformity in laying hen production buildings, a case study was conducted. The production buildings on the same farm complex with similar bird densities, bird ages, and environmental control management were monitored hourly from May 199 until February 1994. Each house contained 48 temperature sensors.

The Turbo Positive™ house (Figure 1) is a positive pressure system with slatted ceiling inlets and fans in the attic space, and is 21 meters x 206 meters (70 feet x 675 feet). The Turbo Negative™ house (Figure 2) is a negative pressure system with slatted ceiling inlets and fans in the pit, and is also 21 meters x 206 meters (70 feet x 675 feet). The perimeter baffle house (Figure 3) is a negative pressure

system with perimeter baffles and fans located in the pit, and is 17 meters x 146 meters (56 feet x 480 feet).

Ventilation rates are basically dependent upon target inside temperature, bird density, and outside air temperature. In the case study, 11 outside temperature ranges were investigated from less than -10 C. (14 F.) to greater than 35 C. (95 F.). Temperature ranges were in increments of 5 C. between -10 C. and 35 C. (-10 to -5, -5 to

0, ... 30 to 35). The standard deviation of temperature within the building for each outside temperature range was calculated.

During cold weather, the greatest stratification of temperature occurs in buildings because less ventilation is needed. This is evident in Figure 4 which shows the standard deviation of temperature in each building for each outside temperature range.

(Turn to Page D7)

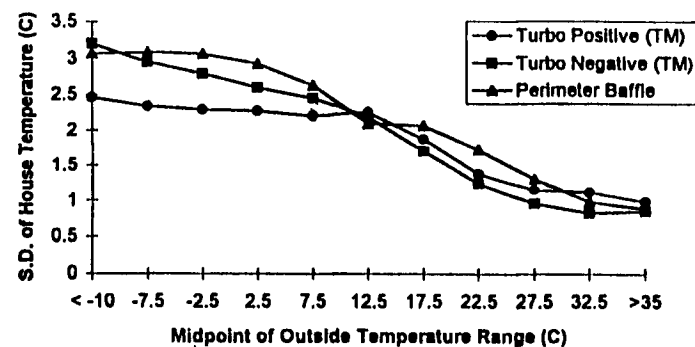


Figure 4. Standard deviation of temperature in three houses during eleven outside temperature ranges.

**CLASSIFIED ADS
PAY OFF!**