New Markets/Agriculture

Curtain-Sided Poultry Houses

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Curtain-Sided Poultry Houses

- Most effective method of reducing cost is to convert it to a totally enclosed house.

- Side wall curtains:
  - Have very low R-Value
  - Responsible for more than 25% of heat loss
  - The number one source of air leakage

- When totally enclosed, fuel savings are between 30 and 50%.

- Bird performance increases due to house temperature and air quality control.
Factors to consider when totally enclosing a curtain-sided house

- Side wall construction
- Cost of various building supplies and insulation materials
- Amount of labor required
- House location

NOTE: Conventional methods of converting curtain-sided houses to solid side wall houses could cost two to three times more than the cost of using spray polyurethane foam insulation.
Advantages of Polyurethane Insulation

Curtain sprayed with polyurethane insulation

Side wall sprayed with polyurethane insulation next to un-insulated tunnel curtain
Advantages of Polyurethane Insulation
Using Closed Cell Polyurethane Foam Insulation to Totally Enclose Curtain-Sided Houses

- Side wall curtains are nailed closed
- Exhaust fans turned on to create high static pressure pulling curtains tight against side wall
- Foam quickly expands when applied to side wall curtains
- 1” to 1 ½” of Polyurethane Insulation provides an R-value of between 5 and 7
- Air leakage is virtually eliminated
Heat Loss Comparison

Thermal images taken in two similarly constructed broiler houses

Curtain side wall - temperature below freezing

Curtain sprayed with polyurethane insulation – temperature below freezing
Heat Loss Comparison

- Cold curtains are strong indicator of significant heat loss through the curtain

- Cold floor temperature near curtains is a result of radiant heat loss from the floor as heat from the floor is lost to the curtain

- Closed Cell Polyurethane Foam:
  - No heat loss in curtains
  - No heat loss in floor
Concrete Walls/Closed Cell Foam

- Typically, Polyurethane foam is applied at 2 lbs/ft
- Concrete applications (footers) are sprayed between 5 lbs/ft & 10 lbs/ft
- Reduced thickness is prone to bird damage
- Very little heat loss (thermal image)
- Leakage eliminated

Curtain and concrete block sprayed with polyurethane insulation
Concrete Walls/Bird Damage

2 lb foam application

Bird damage to 2 lb Polyurethane insulation

10 lb foam application

Very little bird damage to 10 lb Polyurethane insulation applied to concrete stem wall
Positive Results
Case Study

- No condensation forming on the concrete
- Reduction in air leakage improved performance of the house’s inlet ventilation system
- Only fresh air entering the house was from the air inlets at the top of the ceiling
- Fuel usage approximately half of previous winter
- Owner reports that fuel usage was approximately half that of his neighbors with similar curtain-sided houses with chicks placed at the same time
- Results attributed to environmental control
Positive Results

Testimonials

“I saved close to $1,600 per week on my four houses; the first couple of weeks after the job was finished. Also, my static pressure has more than doubled.”

Bucky Malcom                 Bostwick, GA                  Harrison Farms Grower

“The product works great and my floors are the driest they have ever been. My fuel cost has been cut by over half this flock.”

Mike Moore                     Calhoun, GA                        Pilgrim’s Pride Grower

“My first batch of chickens was 101 points above average and 44 points above average on fuel. During the growing cycle the most fans I had to run was 4 compared to my other farms where I had to run 6 and 7 fans.”

John M. Gardner              Florala, AL                           Perdue Grower
Potential Problems

Darkling Beetles

- Damage from darkling beetles
  - Depends on beetle population
- Beetle damage is prominent in areas where birds pecked away harder surface of foam, exposing the softer insulation underneath
- Houses must be cleaned every flock or every other flock

NOTE: If producer can’t control their beetles, it is questionable if spray polyurethane foam insulation is the right choice for enclosing their curtain-sided houses
Potential Problems

Wood shavings

- Spray polyurethane is prone to damage from chunks of wood and rocks thrown by shavings truck when fresh bedding is added to the house.
- The small holes, not causing significant heat loss, offered another avenue for darkling beetles to gain access to softer interior of the foam.
Eliminating the Problems

- Switch to a higher density foam
  - Downside is higher initial costs
- Spray Polyurethane insulation with some type of coating to make it harder for beetles to burrow into the insulation
  - Cost is higher but improves the life of the product
Spray Polyurethane is a viable option

- Costs for spraying a four foot curtain in a 500 ft house runs between $3,500 and $5,000
  
  (Return on investment can be as soon as two growing cycles)

Question: How long will spray polyurethane foam last?

  ✓ If beetle populations are kept at a minimum
  ✓ If insulation is protected from sunlight

Answer: It is not unreasonable to expect a life as much as ten years.