

### **Feature article**

## **Solid Sidewalls for Broiler Houses?**

With energy prices as they were last year poultry growers and managers are asking many questions about the advantages and possibilities of solid sidewalling broiler houses. Many growers probably think of solid sidewalling primarily as a way to save fuel costs. But there are other advantages, as well as potential drawbacks. There are many factors that should influence a decision to put in solid sidewalls in either a new or retrofit house. This newsletter will attempt to shed light on the most important factors to consider, as well as the pros and cons of this practice. Perhaps the best way to tackle this topic is look at the most commonly asked questions about solid sidewalling and try to see how they should be answered. We will also try to outline the reasoning behind each answer.

### **Question 1: *What is the major benefit of solid sidewalling?***

In general, a solid sidewall house will use less energy than a curtain sided house. How much less energy will be consumed depends on whether we are going from an old-fashioned 5-foot curtain sidewalled house, or from an updated curtain-sidewall house. If we compare a new solid sidewall house to an old 5-foot curtain-sided house, in cold weather we might save as much as 40% on the fuel in the solid sidewall house. However, if we compare a solid sidewall house to a modern curtain house with 24-inch curtain openings, curtain flaps and insulation above and below the curtains, we may only save in the neighborhood of 15% of fuel.

There are many factors to keep in mind. First, curtains have no insulation value. Their R value or resistance to heat flow is only about 1.5 or so. Walls in solid sidewall houses even without added insulation batts or boards can have R values in the 4 to 5 range, and well-insulated solid sidewalls can have R values in the 11-plus range.

**Going solid on both sidewalls adds to risk of catastrophe, but saves more fuel**

If you do the simple mathematics of the heat losses through the walls in a solid sidewall house, it is obvious that they will save gas. (See our last newsletter, issue no. 11, for detailed discussion of this.) Most producers who have solid sidewalled at least one wall, have minimized the curtain openings in the other wall and have well sealed the house, have saved in the neighborhood of 25% on fuel over their houses that have not been solid sidewalled.

**Solid sidewall houses can save a grower up to 40% in fuel costs**

### **Question 2: *Should I solid sidewall one or two walls of my house?***

This is one of the most debated questions in the poultry industry. Many live production managers are beginning to say the answer is "wall them up." But others who have seen catastrophic failures and have had problems with power are hesitant to completely close up both walls of the house. Some managers believe that leaving a curtain with curtain drops on the south side of a poultry house will afford some protection against generator failure in moderate weather until birds reach approximately 5 weeks of age. Of course this assumes that curtain drops are set to operate and do not malfunction.

Other managers will note that even in a solid sidewalled house with a curtain opening on one side, birds will be lost in an extended power outage, and therefore there is no real use in having the curtains. Emergency generators are essential either way, but following the total "wall 'em up" philosophy makes it even more imperative to be sure adequate and reliable generators with automatic transfer switches are installed and maintained religiously.

**Energy-Saving Videotape – Now available from Auburn University: *Wintertime Broiler House Ventilation for Reduced Fuel Costs.* This 42-minute video details energy saving methods and best wintertime ventilation techniques. Contact Jim Donald, Biosystems Engineering Dept., 228 Tom E. Corley Bldg., Auburn University, Alabama 36849 (334-844-4181). More information on the tape is available on the Auburn poultry website [www.poultryhouse.com](http://www.poultryhouse.com).**

Looking at this question from the standpoint of controlling fuel costs favors solid sidewalls on both sides. If the decision is made to solid sidewall only one wall of an existing house, then the other wall should be retrofitted to the best possible curtain scenario there is. You should strive to improve the curtain sided wall because it will be the major source of heat loss and air leakage.

**Question 3: Do I have to insulate when I solid sidewall?**

Obviously when we are building a new poultry house we should choose a style of construction that would allow us to insulate when we solid sidewall. This can be extremely difficult in a retrofit house. Solid lumber sidewalling is a practice that is popular and can afford an R value in the 4 to 5 range when we look at the total wall of the house. Two-by lumber is run between sidewall posts, heavy 30 lb felt is placed on the outside, and then tin is placed on top of the felt. In addition to providing some insulation value, this house becomes fairly tight and thus there is a real advantage to solid sidewalling even without adding insulation boards or batts. If construction techniques allow the use of insulation such as R-11 fiberglass insulation, then the heat losses will be even further reduced. A drawback of board type insulation is that it is difficult to rat- and mice-proof.

**New solid sidewall construction should be designed for insulation, but adding insulation may be difficult in retrofit work**

**Question 4: I have heard that solid sidewalling is not recommended by some poultry people because it makes it impossible to air out the house between flocks.**

**Solid sidewall houses can be dried out between flocks by running a ventilation fan on timer**

This question has been discussed by many poultry scientists for years. Some of the most knowledgeable people feel that it is not the opening of the house up to the elements that helps us reduce microbial and infectious causes but the length of time between flocks that is more important. In solid sidewall houses the ability to let sun in the house is not present. This is also true in blackout houses that leave curtains up. Proper length of down time is considered the key factor, not the fact that the house is open or closed.

The consensus seems to be that during the down time in solid sidewall or tightly closed curtain houses, we should close these houses up, run one ventilation fan on timer, and allow ammonia and moisture to vaporize into the air, thus letting the litter composting help dry the house out.

**Running tunnel fans while de-caking or spreading new litter provides clean, fresh air for workers**

**Question 5: I have heard that spreading new shavings, working in the house, and de-caking are very difficult in the solid sidewall house.**

There is probably some truth to this. However, many growers that we have talked to report that if some of the tunnel ventilation fans are run during de-caking or other operations, it is actually more pleasant in the house. Another technique that is used is to cake only in one direction, from the tunnel fans toward the tunnel inlet. This necessitates backing up in the house, but it makes it almost certain that the airflow to the tractor operator is fresh air that has not been contaminated with dust.

**Question 6: What is the cost of solid sidewalling an existing house?**

This is a very difficult question to answer, but at the present time lumber prices are fairly low and (depending on construction techniques) the cost of solid sidewalling is about as low as it is going to be. In looking at a retrofit a grower should get a price on a retrofit with curtains and flaps and a retrofit with solid sidewall. The solid sidewalling is usually slightly more expensive, but we eliminate curtains to have maintenance problems with down the road, and we eliminate curtain drops. Many growers we have talked to have paid roughly \$1200 more per sidewall to solid sidewall a curtain sided house than to replace that sidewall with a modern curtain with flaps and pockets. These numbers are fairly general but the key here is to price the house both ways, determine the actual dollar difference in cost, and then take into account the fact that you eliminate future curtains, you reduce fuel costs even more, and you make the house even tighter (assuming the job is done right).

**Cost comparisons of solid vs curtain walls should include curtain maintenance and replacement costs**

**Question 7: What is the most common mistake in solid sidewalling?**

Unfortunately, there is a belief that if a house is solid sidewalled that it is tight. It is true that solid sidewall houses should be extremely tight if they are done correctly. But we have seen many houses that are totally solid sidewalled that are still not tight enough to ventilate properly. This is one of the most serious problems



A common solid sidewall retrofit is to nail 2-inch lumber over the curtain opening, as shown here at left. It is important to put a good vapor barrier such as 30# felt on the back side of the lumber before nailing the tin on the outside. Putting fiberglass or batt insulation into the wall in this type of construction is difficult. The photo at right shows how this type of construction might look from the outside. Note the new tin over where the curtain opening used to be.



Photo at left above shows the interior of a new solid sidewall house that has been built on a block or poured foundation wall. Traditional 4 inch wall thickness allows the use of a fiberglass batt with an insulation value of R-11. It is very important to put a full vapor barrier over this wall before it is covered with plywood or OSB siding. The finished wall would look like photo at right from the outside before the tin is applied.



A solid sidewall does not by itself guarantee that a house will be very energy efficient. House type, construction techniques, and sealing/caulking are all important factors. The house at left pulled 0.12 inches on a static pressure test, which is very poor for a solid sidewall house. This house happens to be a retrofitted high ceiling house, like the house shown on the right before being solid sidewalled. High-ceiling straight leg steel truss houses such as these are the hardest types of houses to solid sidewall because there are very few intermediate structural supports to nail to. The importance of obtaining tightness cannot be overstated. You cannot properly ventilate a loose house, whether it has solid sidewalls or curtains.

that we can have in a poultry house. A solid sidewall house that will not pull a 0.20 static pressure with all doors and inlets closed has problems with respect to construction and/or sealing techniques. All carpentry joints must be sealed, either with regular caulk, expanding foam, or foam tape.

In particular, one of the hardest types of houses to solid sidewall is the high ceiling steel truss house. The trusses are on 10-foot centers and there are no intermediate supports between trusses to nail lumber or wall material to and thus it is very difficult to solid sidewall. Builders and distributors are working on techniques to solve this problem in the high ceiling steel truss type house.

**Question 8: What type of standby generator and equipment are necessary for a solid sidewall house?**

The general recommendation for a four-house farm is to have a generator capable of supplying at least 100 kW, or 25 kW per 40 x 500 poultry house. This generator must be equipped with automatic transfer switches that are capable of bringing the entire farm up to full load within a few minutes. It is imperative that the generator be sized, wired, and maintained properly. Some generator manufacturers are providing adequate generator sizing but are not providing adequate horse power rating of diesel sets to run generators. A 100-108 kW installation should have approximately a 165-horsepower engine to power the generator. This is simple mathematics because 1 horsepower equals about 746 watts of electricity. Then we need about another 10-15% in reserve. Sizing the generator and being certain that it is well maintained and exercised is an important part of the decision to go solid sidewall.

**The Bottom Line**

Solid sidewalling is usually first thought of as an energy saving technique, improving the grower's bottom line by lowering fuel costs. In the last newsletter (Issue #11), we showed that going from an old-fashioned curtain house to a fully-enclosed and insulated house might save a grower from \$1,200 to \$2,000 per broiler house. So the potential savings are significant. But solid sidewalling can also be seen as contributing to better flock performance because it generally allows better control of heating and ventilation. The resulting better conditioning of the environment for the birds can also improve the grower's bottom line.

The drawback is that if we rely totally on mechanical means for ventilation we are more at risk of catastrophe from power failure or failsafe failure. Losses in solid sidewall houses without power are catastrophic and the decision to go solid sidewall is a calculated risk.

Before you solid sidewall you should seriously look at all the factors, and discuss the pros and cons with your broiler manager and live production personnel. Probably absentee growers or growers using hired help especially should make sure this decision is right for them. Going to solid sidewalls is a big decision for the poultry grower.

**Solid sidewalls deliver energy savings only when properly sealed to prevent air leaks**

**Solid sidewalling can also help improve flock performance by giving better control of in-house conditions**

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*Jim Donald*  
Jim Donald, Extension Engineer  
Auburn University

*Mike Eckman*  
Mike Eckman, Extension Poultry Scientist  
Auburn University

*Gene Simpson*  
Gene Simpson, Extension Economist  
Auburn University

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