*Poultry Engineering, Economics & Management*

**Newsletter of the**

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# Choosing Sidewall Insulation

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Every winter when the weather gets cold we get lots of calls about sidewall insulation for poultry houses. Having to turn the heat on (and up!) definitely brings to mind the potential benefits of insulation. Whether you are considering installing wall insulation as a retrofit upgrade or improving new house construction insulation methods, it has to be done the right the first time.

There are three sidewall insulation scenarios that we most frequently see: fiberglass batts, blown cellulose, and spray foam. This newsletter presents the facts about these three technologies as we have seen them in many working poultry farms, especially with the aid of thermal-imaging cameras.

How important can sidewall insulation be? Wall insulation directly affects fuel usage. If you get it wrong to begin with, it will affect the cost of operating the house for as long as the next 30 years. There are about 8,000 square feet of wall area in a 40 ft x 500 ft poultry house; which is a lot of area to lose heat through. The goal is to choose a wall insulation system that will insure tightness, have good R value to keep heat in the building, be reasonably priced, and deliver good value over a long enough expected lifetime. What insulation technology is best will vary from farm to farm, depending on the particular situation, including whether we are considering new construction or retrofit installations. What is best for a new house might not be ideal, or even feasible for a retrofit.

**Fiberglass Batt Insulation**. For new poultry house construction it is hard to beat a 3.5 inch R-11 or 5.5 inch R-19 batt (depending on wall cavity thickness), properly secured in place so that it won't move over time. Batts plus a good 6 mil poly vapor barrier installed over the posts or studs on the inside of the building and then covered with OSB or plywood forms a very durable and well insulated wall. Our investigations have shown that these walls hold up very well over time (see Figure 1 inside). A drawback with fiberglass is that while it works well in new applications it can be difficult and costly to use in some retrofit applications.

For more information on use of fiberglass batting for retrofitting older poultry buildings, see our newsletter #46, *Controlling Sidewall Energy Losses,* available at *www.poultryhouse.com*. For best results, the wall cavity must be totally filled with insulation. Never install a 3.5-inch batt in a 5.5-inch wall. Empty air space will allow the batt to shift and settle and provides little or no R-value. Installing a 6-mil or equivalent vapor barrier on the interior side of the insulation is imperative. Installing an exterior vapor barrier is not recommended because it will trap moisture in the wall cavity.

**Blown-in cellulose after 6 years**

**Blown Cellulose Wall Insulation**. Blown cellulose was designed mainly for overhead applications such as the attics of dropped ceiling

*continued on page 4 –*

**Thermal infrared-sensing cameras are very useful for showing temperature variations. Lighter red-to-orange-to-yellow colors show higher temperatures. The darker, red-to-purple-to-black colors show lower temperatures.**

**This photo shows a sidewall that was insulated with blown cellulose six years previously. The thermal image is almost like an X-ray showing how the cellulose has settled, leaving the top one-third of the wall basically un-insulated.**

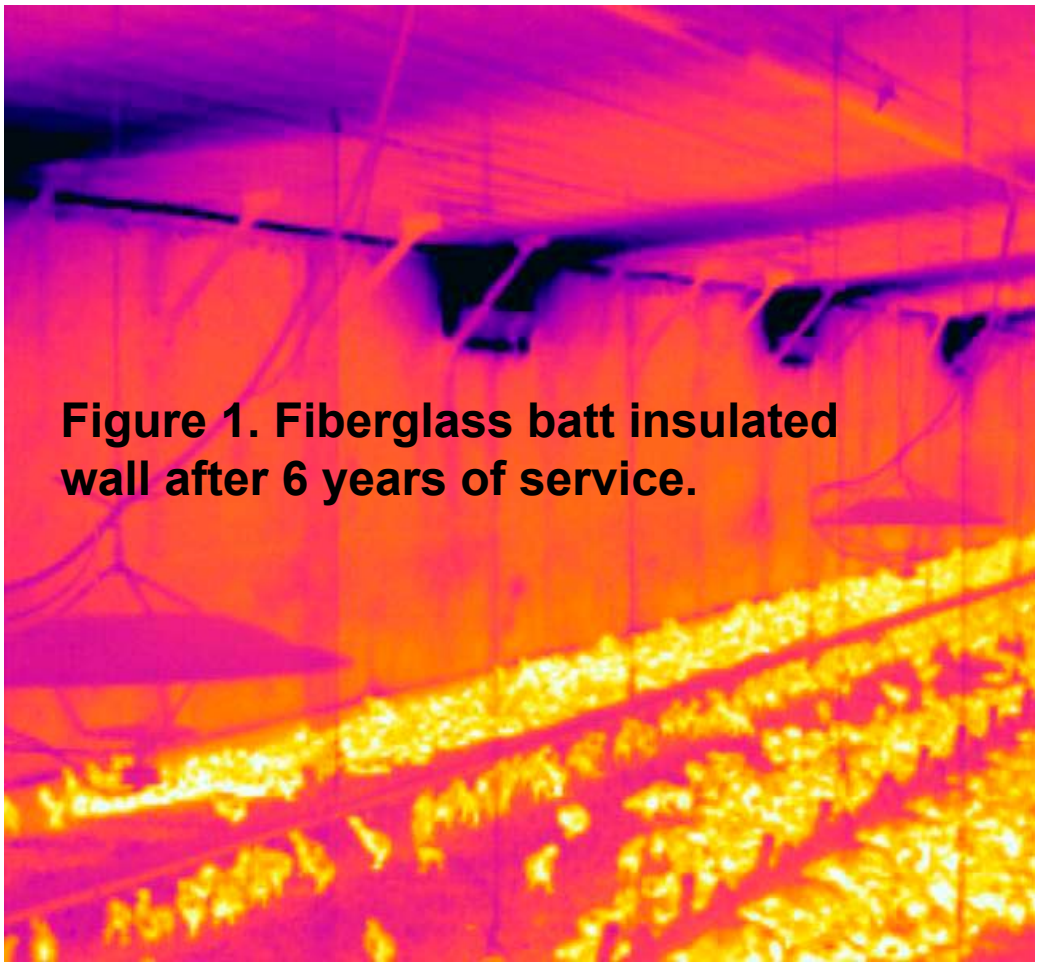


**Figure 1. This thermal image shows how well properly installed fiberglass batt insulation is performing after 6 years. Note the uniformity of the wall showing no voids, gaps or settling of the fiberglass.**

**Note: In thermal images, lighter red-to-orange-to-yellow colors show higher temperatures. The darker, red-to-purple-to-black colors show lower temperatures.**

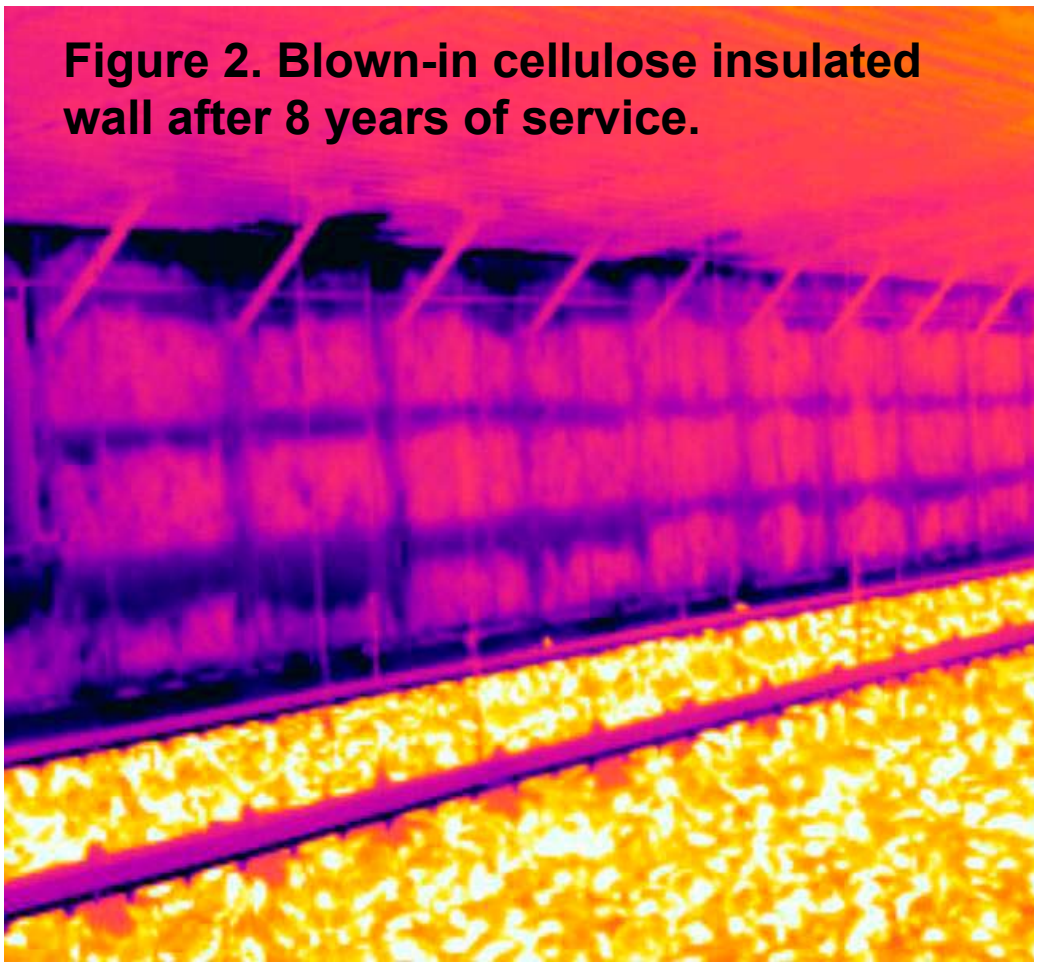


**Figure 2. This thermal image shows a blown cellulose wall that was horizontally blocked in an effort to minimize settling.**

**After 8 years of service, settling in each of the blocked sections is evident – meaning significant insulating value has been lost.**

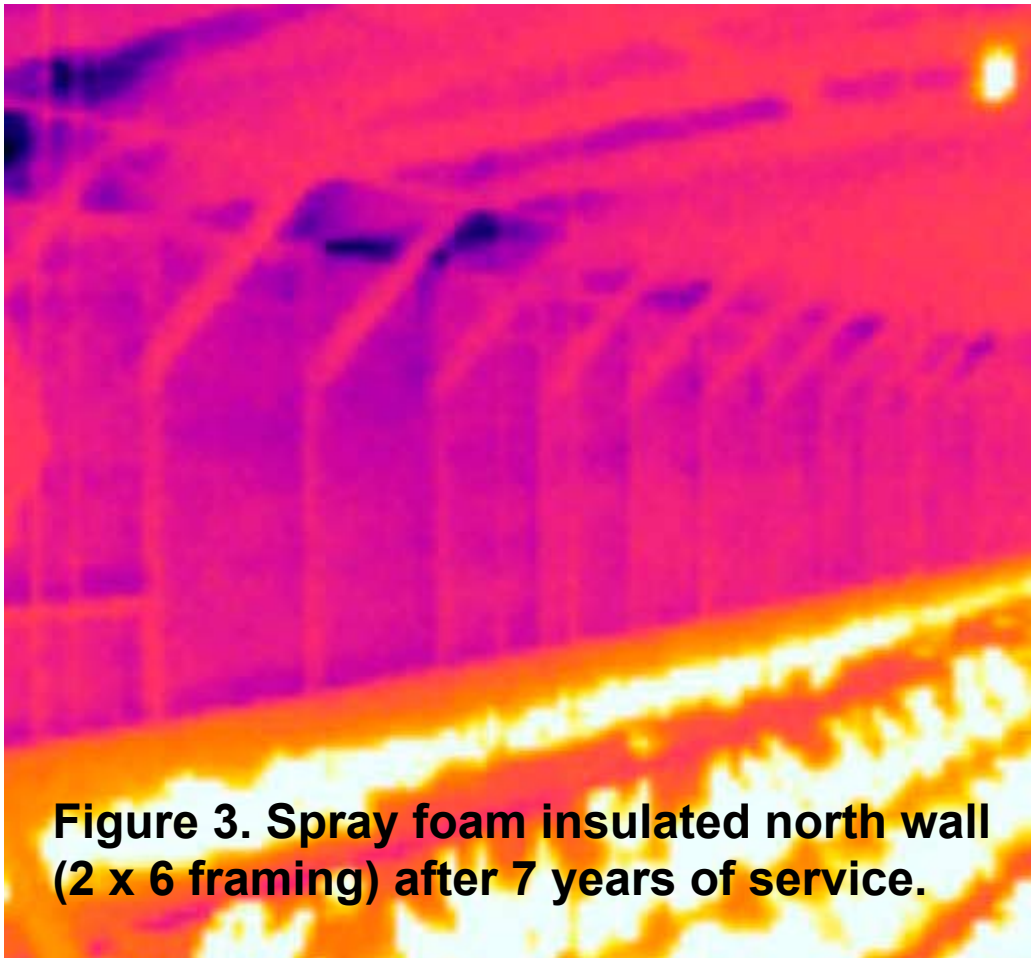

Figure 3. Spray foam insulated north wall (2 x 6 framing) after 7 years of service.

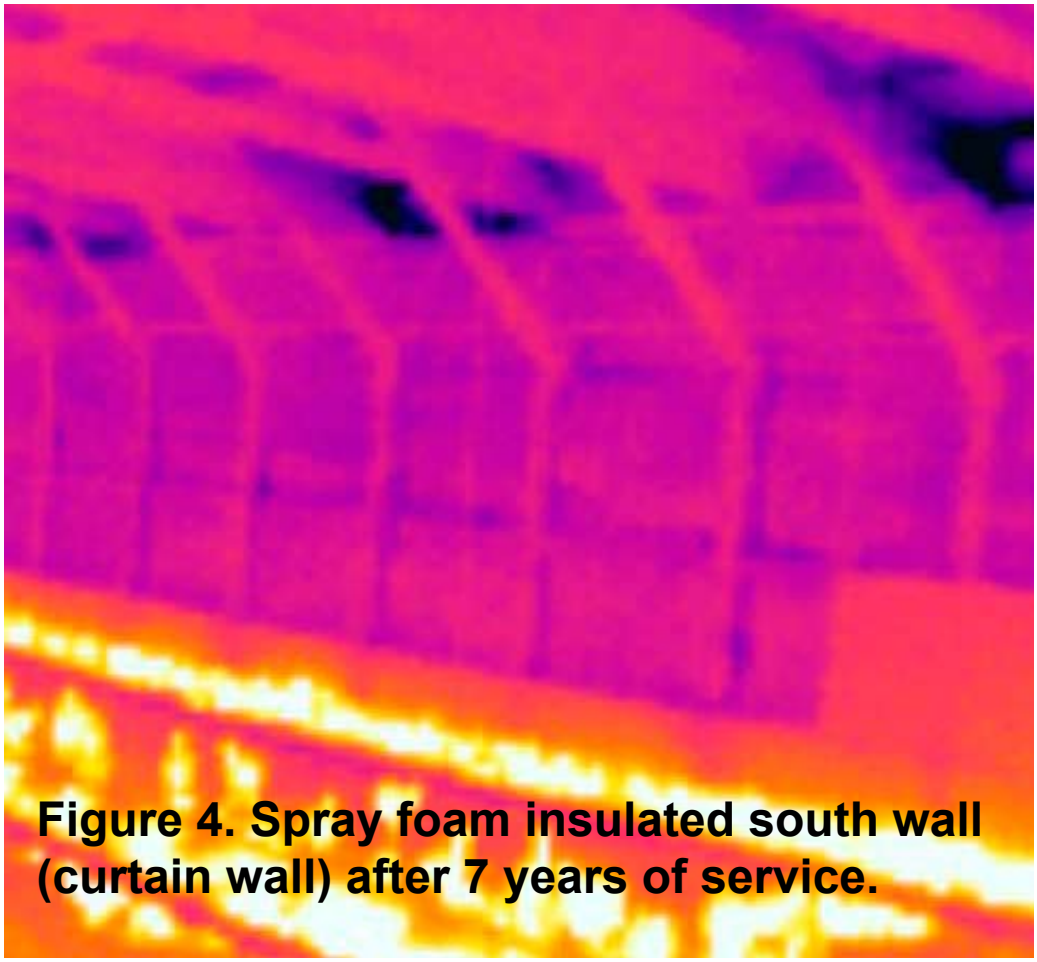

Figure 4. Spray foam insulated south wall (curtain wall) after 7 years of service.

**Figures 3 and 4. Thermal images of spray foam retrofit sidewall insulation. North wall is spray foam over 2 x 6 lumber wall and south wall is spray foam over curtain.**

**Sprayfoam is performing very well in this retrofit application after 7 years.**

houses. In vertical applications such as a wall panel, it has a tendency to settle over time, which leads to a loss of insulating value. For this reason, wall applications are typically not intended or recommended by manufacturers.

Prevention of settling has been attempted in many ways. Adding a glue binder with sufficient water to the mix and placing runs of horizontal blocking in the wall are two common practices. As you can see by Figure 2 inside, significant settling may occur over time even when blocking is used. Settling creates a serious heat loss issue and one that cannot be easily repaired. We would be very cautious to recommend the use of blown cellulose in vertical wall panels until we have sufficient data to be sure that the settling problem has been solved. If blown cellulose is used in a sidewall, a 6 mil vapor barrier must be installed *before* OSB or plywood is applied to the posts.

**Spray Foam Insulation**. Closed-cell polyurethane spray foam, with an insulating value of about R-7 per inch, has been used in the poultry industry for about 8 years in new or in retrofit applications where the use of fiberglass batts would be almost impossible due to high costs of carpentry or structural modifications to prepare the house for the batt installation. An older poultry house can be spray-foam transformed into a well-insulated and tight building within a matter of hours (see Figures 3 & 4 inside). We have done extensive field research on spray foam and its value in retrofit applications. See our newsletter #43, *Poultry House Energy Retrofits for Fuel & Cost Savings*. The life expectancy of a typical spray foam application is 7-10 years, depending on a wide range of variables.

The major possible drawback to spray foam is that it is susceptible to mechanical damage and damage by darkling beetles. In most applications, a higher density (6-10 lb) spray foam must be used in the lower 24 inches of the wall to keep the birds and beetles from damaging the foam. An alternative is to use lumber scrape boarding at the bottom of the wall. Considering all factors, spray foam is excellent in most wall retrofit applications if coupled with a good beetle control program.

In new housing we have seen this product being sprayed directly into wall cavities against the exterior metal, with no other insulation being used and no other vapor barrier installed, and then OSB or plywood being placed over the empty wall cavity. This is not equivalent to an R-19 fiberglass batt wall; and reports are that this system costs more to install than fiberglass. In addition, this kind of application could be subject over time to moisture accumulation and beetle damage which is difficult to monitor and remedy.

## The Bottom Line

There are many pro's and con's associated with different wall insulation technologies for new poultry housing and for retrofits. Getting the right sidewall insulation for your farm requires careful consideration of all the variables. But the benefits are clear. By getting it right and properly walling up we can improve the uniformity of the bird environment, save a significant amount on our fuel bill, and improve the structural integrity and longevity of our houses – all of which lead to long-term improvements in overall profitability.


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