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Poultry House Insulation
Michigan State University Extension Service
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POULTRY HOUSE INSULATION

By A. J. BELL and J. M. MOORE

Suitable insulation acts as a direct help to adequate ventilation. This is one reason why the laying house should be filled to capacity during the cold winter months. The body heat of the birds makes the inside of the house much warmer than the outside. Insulation increases this difference between inside and outside temperature. The warmer the air, the greater the amount of moisture vapor it can hold. This warm, moist air being so much lighter, crowds to the top of the house, where the outlet ventilators should be placed to exhaust the moisture-laden air.

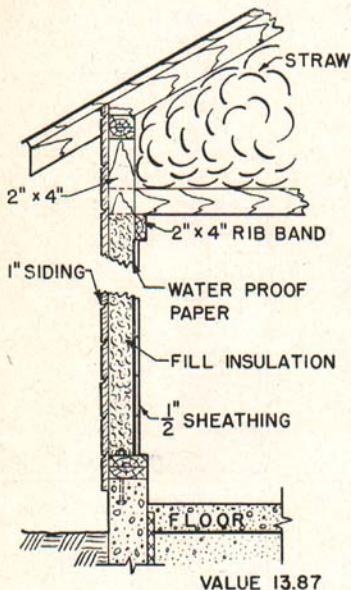


Fig. 1

Laying hens have a high body temperature (106°-107° F.). Their feathers provide good insulation for their bodies, but they do need plenty of fresh air. When cold weather sets in, many poultrymen close their laying houses up tight. This does not produce conditions normal for chickens. They need fresh air. Bringing it to them without any direct draft, is of great help in preventing colds and other respiratory troubles in the laying house.

The wet, cold condition sometimes found in poultry houses is

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usually ascribed to inadequate ventilation, but more often it is the lack of insulation or perhaps a combination of both.

We have all observed moisture condensing on the outside of a water glass on a warm day. The same thing happens in a poultry house when warm, moist air comes in contact with a cold wall, ceiling or floor.

When fresh cool air enters the building, it drops to the floor, picking up heat and moisture. It then rises to the ceiling and moves outward to the wall. If the ceiling and walls are cold, the warm air cools and squeezes out its moisture which either stays there as moisture, or in the form of frost if the temperature is cold enough. If the walls are warm, the moisture stays in the air until it leaves the building through the ventilating system. The only thing that keeps wall surfaces warm is their insulating value.

All building materials have some insulation value—some good, some poor. A laying house made of materials with poor insulating value will result in a cold wet building in winter and an equally hot house in summer. Adequate insulation in the house prevents sudden changes in

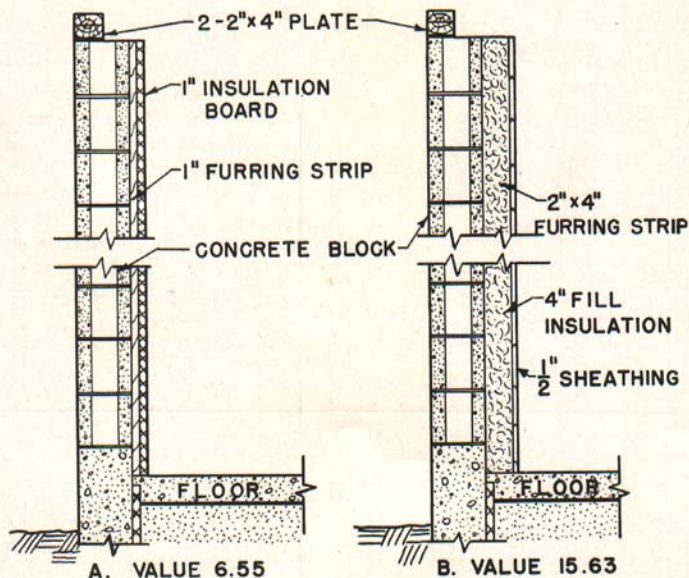


Fig. 2

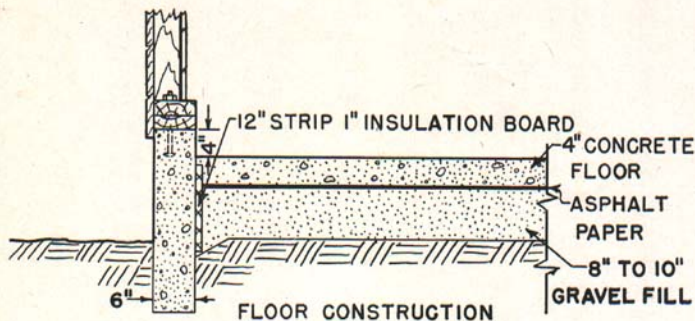


Fig. 3

temperature, thereby preventing the drop in egg production that accompanies them.

One way of rating the insulating value of building materials is by their ability to prevent the passage of heat. Masonry materials such as stone, tile, brick, concrete, concrete blocks or cinder blocks all have rather low insulating values, and must be fortified with one of the so-called insulations to make them satisfactory for livestock structures.

Other materials, such as commercial insulation, have a high insulation value. These include the board, batt, fill, and reflector types.

According to the United States Department of Commerce, cinder block has a value of .20 per inch of thickness; wooden boards, 1.25 per inch; insulation boards, 3.03; fill type, from 1.70 to 3.22. An air space is usually given a high insulation value, but actually, it is very low, except in spaces less than one-half inch wide. The inner and outer wall surfaces also prevent the passage of some heat.

By experience and experiment, it has been found that poultry house walls and ceiling (or roof) should have a value of at least 10. In order to get it, there must be more than the usual one or two thicknesses of boards.

Figure 1 shows a wall built of siding, studs, fill insulation, waterproof paper and sheathing. This wall has a total value of 13.87. If the straw loft type of house with a two-foot depth of straw is used, no additional insulation is needed in the roof, but in shed type houses, the roof should have as much or more insulation than the walls. Also in Fig. 1, you will note the joists are placed one foot below the plate. This is done to prevent the accumulation of moisture under the plate. You will also note the waterproof paper on the inside of the studs. This paper is used

to prevent, as far as possible, moisture from entering the insulation. In spite of this, some vapor will get in and will rise. If such vapor comes to a header or plate, it will lie dormant, and rot the fill, but if it can get up into the attic, as shown in Fig. 1, it will pass out through the louvers and cause no harm. The top should always be left open to allow the moisture to leave.

Fig. 2 shows a cinder block wall with 1" x 2" furring strips and a 1" board insulation (a); and one with 2" x 4" furring strip, ½" sheathing and fill type insulation (b). The (a) wall section has a value of 6.55. The (b) section has a value of 12.07 using shavings as fill and 15.63 with best commercial fill insulation. The insulation board should be painted with two coats of asphalt base aluminum paint and protected by plywood or cement board wherever the birds can pick it.

A cold floor is a source of much trouble. Many times the roof and walls are insulated while the floor is not. Eight to ten inches of fill underneath the concrete floor will help. Fill material should be gravel, stone, or cinders. After the fill has been placed, cover with 30- or 60-pound asphalt paper with the sides and ends lapped at least 2 inches. These laps should be well asphalted. On this base, pour 3 inches of concrete. For ease in cleaning, it is suggested the floor be sloped 1 inch for each 10 feet of width from north to south. To further insure a dry floor, deep litter is often used. During the fall months, the depth of litter is gradually built up to 12 or 15 inches. Many laying houses are cleaned only once or twice a year where the building is well insulated and deep litter is used. A piece of 1-inch insulation board 12 inches wide treated with asphalt is placed between wall and floor to cut off the cold and prevent condensation at this point (Fig. 3).

Adequate insulation plus a good ventilation system will eliminate dampness and many other troubles in the laying house.