

# Preventing Fires in Litter Storage Structures

► A litter storage structure is an important component of a poultry producer's waste management program. A danger with litter storage is the possibility of fire. Learn the common factors in litter storage fires and recommendations for preventing them.

Poultry producers must decide what to do with litter production from their flocks. Litter must be removed from poultry houses on a regular basis and used in an environmentally sound manner. By properly managing litter, poultry producers can use it as fertilizer or feed and benefit economically.

For poultry litter to be used effectively and efficiently, it must be stored until an appropriate time for field application to crops or until required for cattle feeding. Consequently, a litter storage structure is an important component of the poultry producer's waste management program. A litter storage facility protects litter from weather and wildlife, helps prevent water pollution, provide flexibility in the timing of application to cropland, and makes it possible to have an end product that can be used as cattle feed. For a description of how to estimate litter production and store litter, see Extension publication ANR-0839, "Broiler Litter Storage."

A danger associated with litter storage, however, is the possibility of fire caused by heat generated within the manure pile. Spontaneous combustion in a litter stack can result from the buildup of combustible methane or the storage of wet and dry litter. Fires may also occur if the manure is stacked too closely to wooden walls that may ignite when the temperature in the litter reaches the wood's flash point. Fires in litter storage structures can be prevented if the storage site is properly located and maintained.

## Common Factors in Litter Storage Fires

**Moisture** is a critical factor in all litter storage fires. Perhaps the most common error made by producers is adding moist litter to a dry stack. Heating and the formation of methane gas begin as the dry litter absorbs moisture. Anaerobic bacteria generate about 50 to 65

percent methane, about 30 percent carbon dioxide, and a smaller percentage of other gases. Therefore, if the moisture content of stored litter is more than 40 percent in a stack with little or no oxygen, conditions are right for anaerobic bacteria to grow, producing methane gas. Heating and methane gas formation can be avoided if litter is allowed to dry completely before it is applied to the stack. If the stack has adequate pore spaces, any methane that forms will escape harmlessly into the atmosphere.

Stacks exposed to wind-driven rain can accumulate moisture and become a fire hazard. Litter should be protected from blowing rain.

**Caked litter** cleaned out from underneath waterers will usually have a high moisture content and can also contribute to litter storage fires. Caked litter will be much higher in moisture than litter located throughout the rest of the house. It is a good idea to separate piles of high-moisture caked litter from drier litters.

**Layering** new, moist litter on top of old, dry litter creates an insulated, heat-producing situation. Litter should be completely dry before being added to a stack.

**Pile size** affects heat release. Pile height and width are more critical than pile length. Small piles provide greater surface area for heat release; large piles increase the chance for excessive heat or fire. A litter stack should be no more than 5 feet high.

**Compacting** litter will trap heat in the pile. Litter or moist cake should not be compacted. Compacting creates anaerobic conditions and prevents the natural venting of methane. Heat is not easily released from a compacted pile.

## Recommendations for Preventing Litter Storage Fires

- Keep litter dry! Wetting litter will not prevent a fire; just the opposite may happen. Protect litter from blowing rain.
- Store caked litter in a separate pile from dry litter.
- Avoid compacting moist or dry litter.
- Stack litter no more than 5 feet high.
- Stack litter away from wooden walls or structural support posts.
- Frequently monitor temperatures at various locations within the pile, and remove any materials that have temperatures greater than 180°F. If temperatures exceed 190°F or if the material is smoldering, notify the local fire department and get instructions for removing the material from the building. Use extreme caution: a smoldering pile can burst into flame when exposed to air.
- Store expensive equipment out of the litter storage structure.

## Conclusion

Good management practices and common sense will enable you to take advantage of the benefits of litter storage. Proper precautions will greatly reduce the risk of loss through explosion and fire.

If litter is to be stored for use as a cattle feed, it should be appropriately deep-stacked and covered with polyethylene for at least 20 days. For more information on how to store litter for cattle feed, refer to Extension publication ANR-0557, "Feeding Broiler Litter to Beef Cattle."

## References

- Donald, J. O., and J. P. Blake. 1994. Broiler Litter Storage. Extension publication ANR-0839. Alabama Cooperative Extension System, Auburn University, AL.
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