SARE Project AS92-1

Poultry Litter Moduling Proj...

On April 8, 1995 two loads (approximately 44 tons) of poultry litter were delivered to the moduling site near Octa, MO. On Monday, April 10, an attempt to make a module with the litter was made. Temperatures inside the litter pile (approximately 3 feet in) ranged from 110 to 120°F. Two litter samples were taken from each load for N, P, K, and moisture analysis. The analysis below is reported on a dry weight basis.

	Sample A	Sample B
N	22.8 lbs/ton	28 lbs/ton
P	51.5 lbs/ton	64.4 lbs/ton
K	37.2 lbs/ton	46.8 lbs/ton

Moisture on delivery 16%.

A Case W20C loader with a 4 yard bucket was used to fill a Harrell Big 12 cotton module maker. Packing of the litter began when it was about one half full. (See pictures of process displayed in order.) When the module maker was full and packed completely, approximately 25% of the second load (an estimated 5-6 tons) remained. The module was approximately 8 feet high, 32 feet long, and 10 feet wide. It took approximately 40 minutes to load the module maker and 1 hour to complete the moduling process.

The module maker would not lift up and break loose from the module on its own hydraulic power mechanism. Assistance from the rear hydraulic arms of the tractor was needed to finally lift the module maker. At this point, the back door of the maker was opened so that it could be pulled off the module. The tractor powering the module maker (approximately 150 hp.) would not pull the maker off of the module. This was a function of two factors; first, intense friction on the sides of the module maker from the packing process was still present despite lifting the maker up approximately 12 inches; second, the ground under the tractor drive tires was extremely loose and let the tires spin. A second tractor (approximately 170 hp.) was hooked to the first tractor and the maker was removed from the module. At this point, approximately 1-1.5 feet of litter sheared off of the sides of the module from the top to approximately 4 feet down the sides. Intense shaking and jarring from the two tractors straining to remove the module maker contributed to the amount of litter which sheared off the sides. (see pictures). As the module maker was pulled away, a module tarp was pulled into place over what was left of the module. This tarp was later secured with a rope to prevent the wind from blowing it off and further deteriorating the module. Intense wind about a week later blew the tarp off of the module. However, it retained its shape fairly well.

The temperature was recorded each day around noon for the first week using a 3 foot module probe. The second week, temperatures were recorded every other day (see Figure 1).

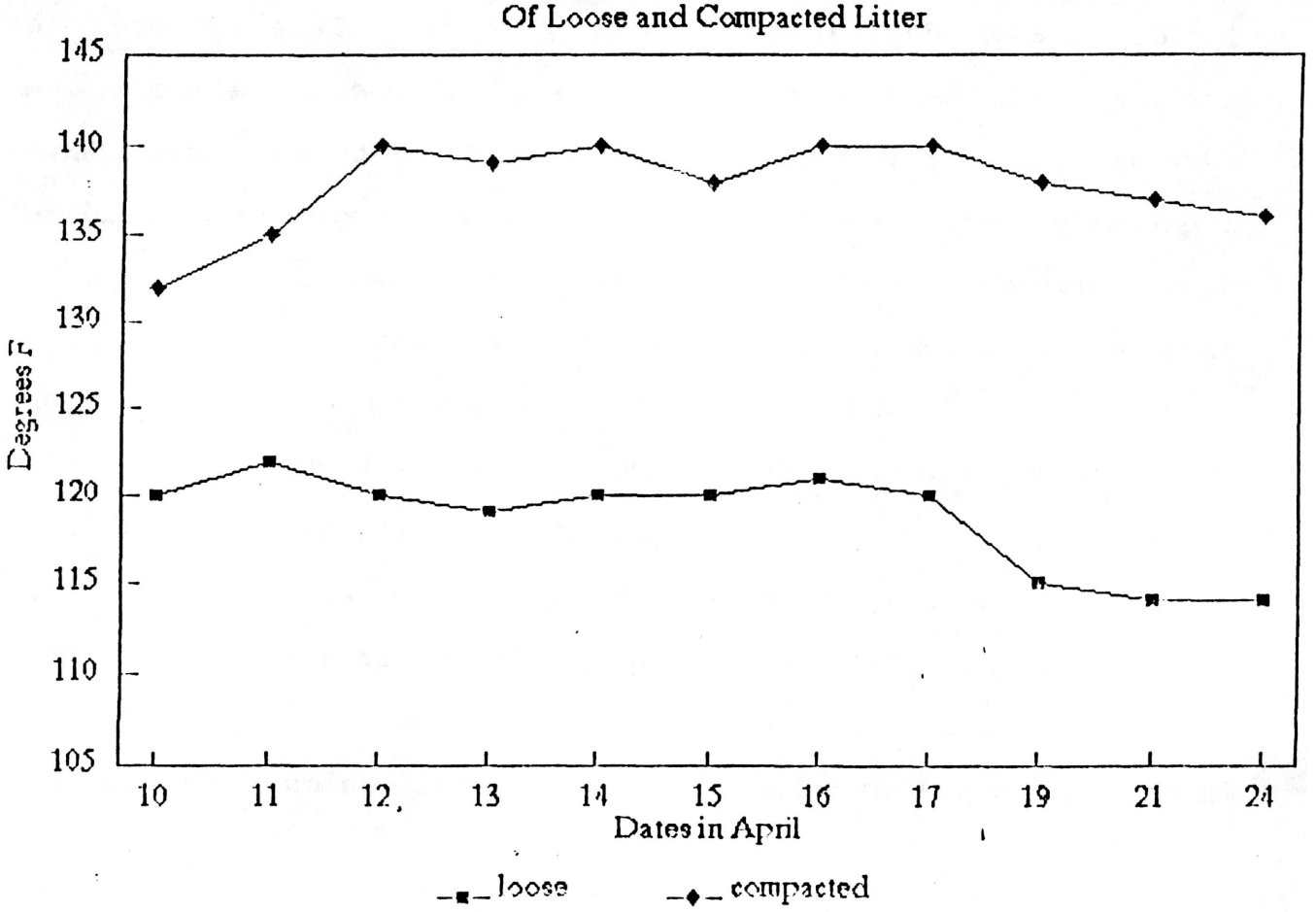
Temperatures were monitored in the loose portion of the module that sheared away upon removal of the module builder and in the compacted portion. Temperatures were about 20 degrees higher in the compacted portion after two days and remained so for the two week period. After 8 days temperatures in both sections began to decline slowly. After two weeks the compacted portion of the module still maintained most of its shape even though the module cover had blown off.

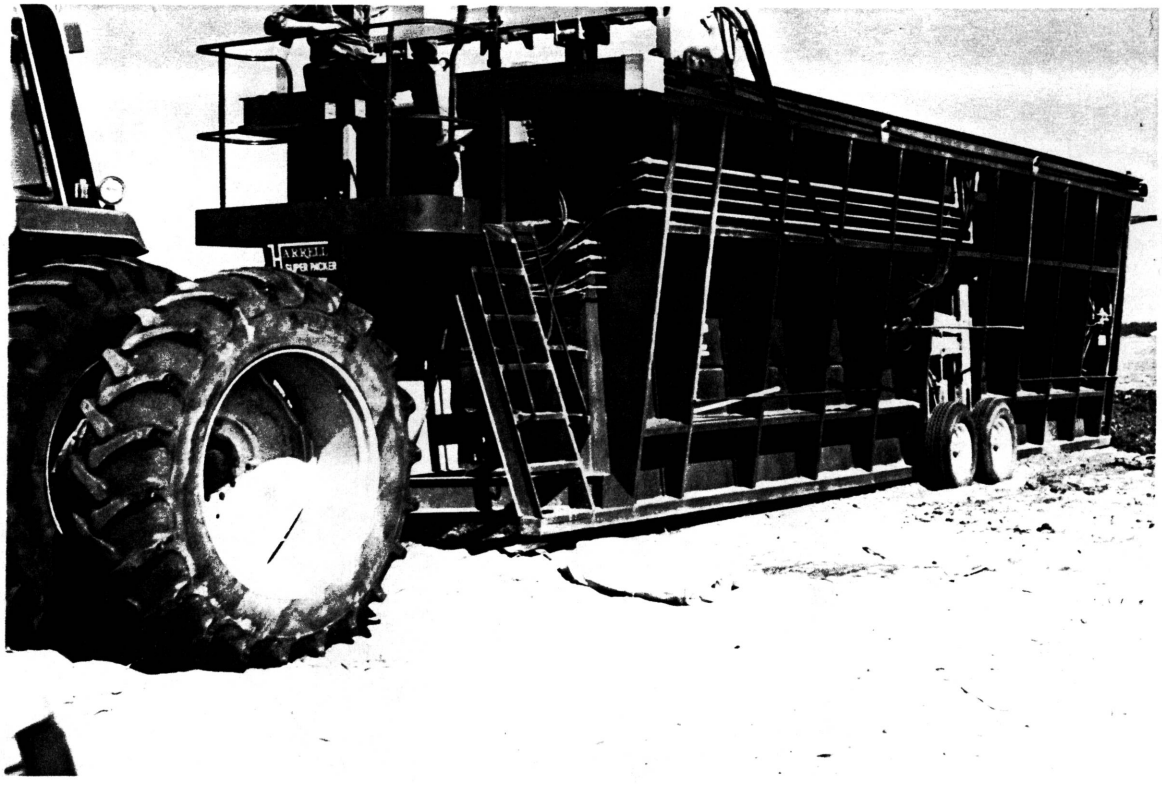
It was our opinion that water added periodically during the packing process would make the module stay together better. It is unknown what the addition of water would do to the condition of the litter and heat build-up inside the module. Also, I believe that some soil (in this case loose sand) was picked up in small amounts by the loader during the loading process. This appeared to contribute to the lack of adhesiveness of the moduled material. We have speculated that a module 1/2 the height of this one would have a better chance of maintaining its shape and form. This could be done by using only one load of litter per module. It would also be much easier to remove the module maker from the smaller module and should reduce the amount of litter that shears off. A module of this size would also be completely covered by a module tarp instead of being covered only on the top half as with a tall module. If, in fact, a cohesive module could be built with one load of litter, it might be possible that a module hauler truck could load and unload it efficiently. This would give the farmer more flexibility in choosing sites to build the initial module which could then be

hauled to the spreading site as needed.

All equipment was steam cleaned after the loading and processing of the module. This process was relatively easy and effective, leaving the equipment clean and without smell. It was felt that this is a very necessary step to reduce deterioration of the equipment from the ammonia in the litter.

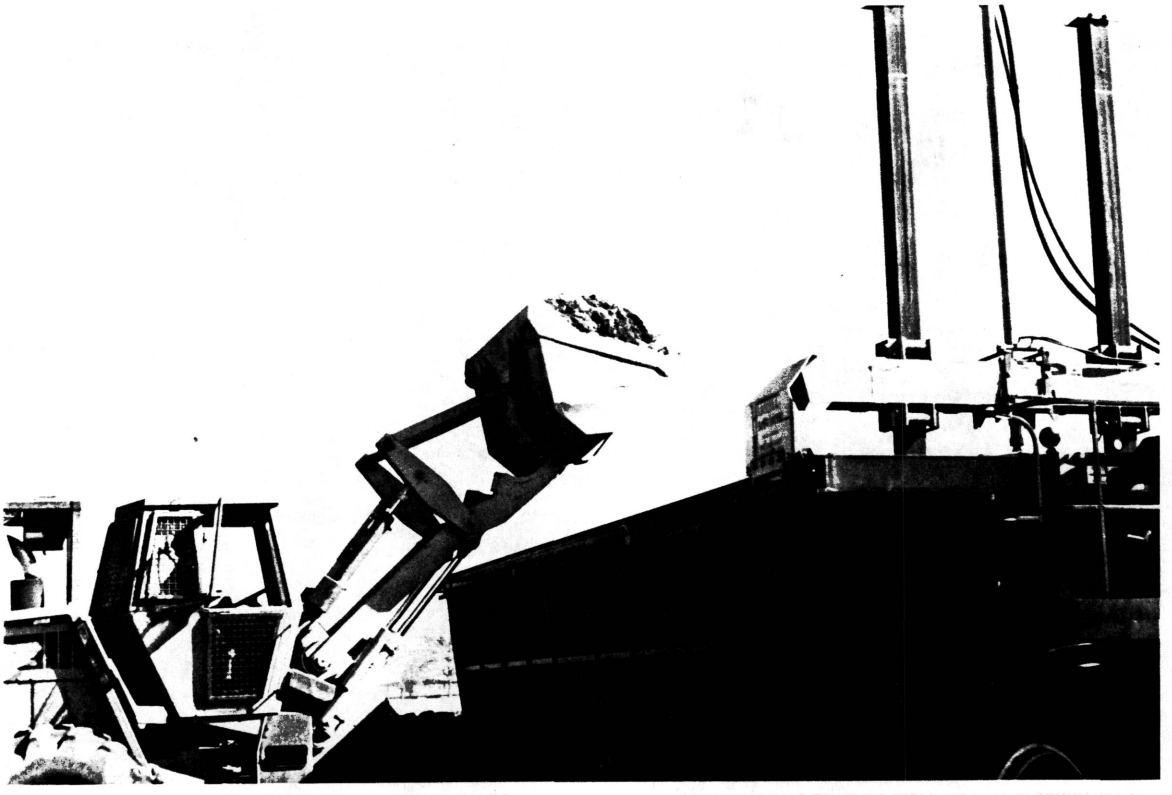
Figure 1. Daily Internal Temperatures





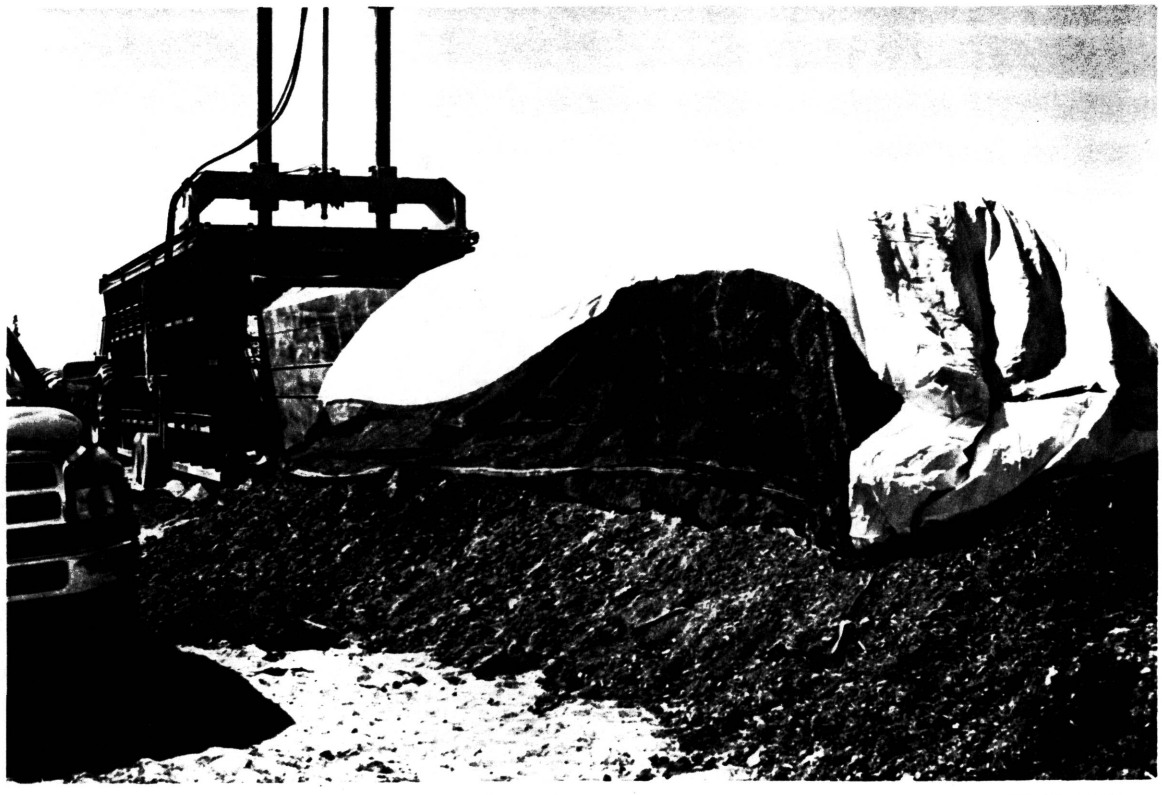
Module Builder

Loader Picking up Litter



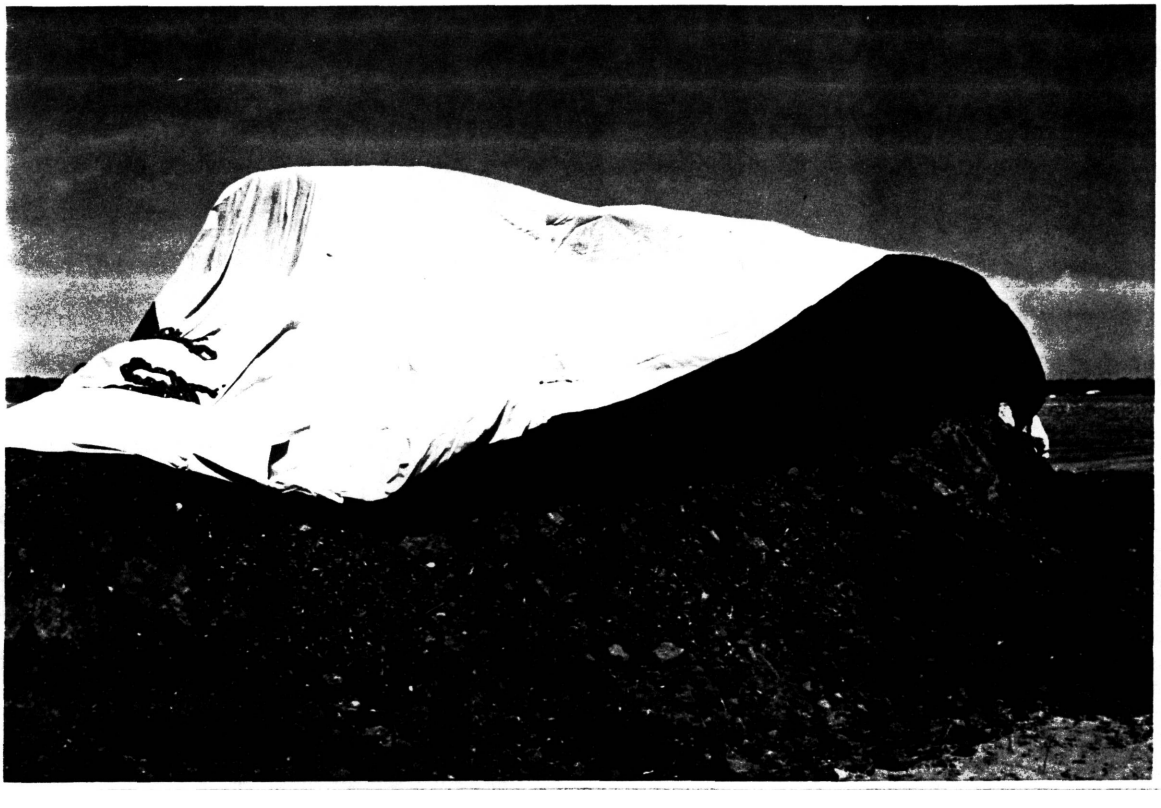
Filling Module Builder

Packing and Spreading Litter



Covered Module

Covered Module Two Weeks Later



Final Packing of Litter

Spreading Tarp