

Grain drying techniques explained

By LAUREL SCHAEFFER
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ROBESONIA — "There are three important factors involved in grain drying," stated Joseph A. McCurdy, professor of agricultural engineering, Penn State University, at a recently held meeting of the Conrad Weiser Young Farmers. These factors, air volume, temperature, and relative humidity, determine the rate and degree of drying.

"A twenty degree increase in air temperature about doubles the water holding capacity," the speaker continued. But increased temperature also increases the chances of mold growth.

Grain drying temperatures should stay below 80 degrees Fahrenheit or above 100 degrees, the farmers were warned, because mold growth outweighs the drying pattern when the temperature is between 80 and 90 degrees.

McCurdy continued to discuss grain drying and storage, using corn as the basis of his lecture after first remarking that he felt one of the better ways of storing the grain was in the silo.

The length storage time is determined by the

moisture and temperature conditions of the corn, related the speaker. A good moisture content is 15 per cent. Corn dried to 12 or 13 per cent is close to being overdried. But the job is not done when the corn is at 15 per cent moisture, it has to be cooled first, explained McCurdy.

The effect of temperature became evident as the agricultural engineer explained a chart that showed the length of time corn at 15 per cent moisture was stored until the first sign of mold appeared when held at different temperatures. At 75 degrees Fahrenheit the corn was in storage for only 116 days before mold was detected, but at 35 degrees the corn did not show any sign of mold until 1140 days.

The problem with cooling corn in fall temperatures is that it can never get as cool as the air with only a fan because the fan increases the temperature a few degrees, McCurdy stated. Spoilage at the top center of bins is not due to leaky roofs but moisture migration, he continued. Grain is a good insulator, the grain in the center of the bins doesn't change temperature as do the outside layers.

This difference causes the

cool air on the outside to slowly fall and the warmer air in the center of the bins to rise, causing moisture migration to the top of the bin where it is cold, resulting in condensation. "Aeration is needed," said McCurdy. A small volume of air should be moved down the center of the bins anytime the corn is 10 degrees above the outside temperature until the corn reaches 40 degrees. This takes hundreds of hours but the corn has to be thoroughly cool, advised the speaker.

"Your nose is one of the best instruments for detecting if grain is going out of condition." It should be checked at least every two weeks, McCurdy advised.

Bin dryers are economical and efficient but are slow and hard to manage, the engineer told the local farmers. Batch bins are good for the conditions in Pennsylvania, using high temperatures for fast drying. Continuous flow are reserved for larger installations, and good handling facilities are needed with them, he explained.

McCurdy also discussed combination systems that reduce fuel and increase capacity. Here corn is heat dried to about 16 per cent and moved to bins where the

final moisture points are removed. But warned McCurdy, "The first bin determines the future plan if other bins are added." If more than one bin is built at the first installation, have a plan for future expansion. "Plans are available, look at them," he advised.

The agricultural engineer also briefly discussed different types of ear corn storage facilities. The long narrow cribs are expensive storage and can only be used for ear corn, McCurdy said. Round wire storage bins should at least have an open center and be restricted to 12 feet in diameter.

The wide cribs or sheds seemed to be the best to the engineer. The cribs he recommended were about 28 feet wide and about 40 feet long with a large triangular or square "tunnel" running through the center where air is forced through. Corn is dried inside to outside. It helps to have as much trash removed as possible, McCurdy advised.

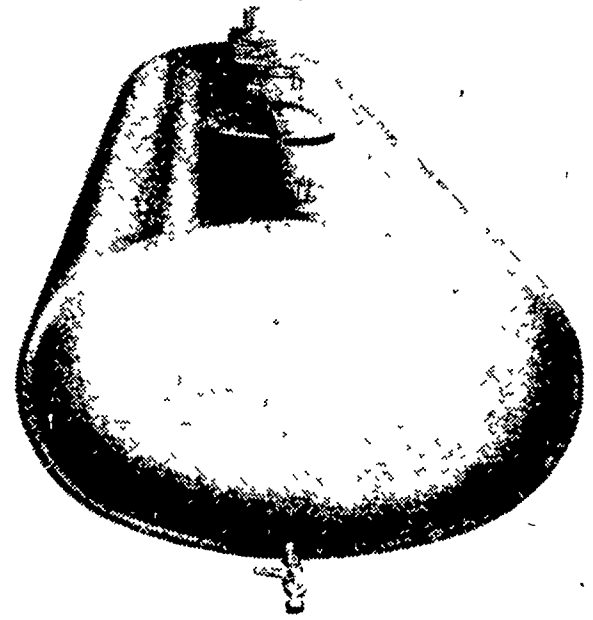
Low temperature, solar assisted drying is being researched in the Midwest, said McCurdy. There will be more of it in the future, but not by the next year, he remarked.

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