Solar grain drying systems evaluated

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LEESPORT - "Heat does not dry grain!" stated Ike Steinhauer of Bernville. It's the relative humidity coupled with the temperature that most significantly affects the costs and time required in grain drying, he related.

Steinhauer was one of several speakers addressing a group of approximately 50 area farmers interested enough to brave the torrential rains of January 24th to attend a meeting on solar grain drying. The meeting, sponsored by the ASC committee and Cooperative Extension Service of Berks County, featured Joseph McCurdy, agricultural engineering specialist, Penn State University; Ivan Z. Martin, representative of Martin Distributors, Lebanon; and Elwood Steinhauer III, Berks County Farmer.

Steinhauer had investigated the costs and practicality of setting up a solar grain drying system for his own use and related his findings to the interested gathering of farmers. McCurdy discussed and evaluated the various ways solar energy has been applied to a grain drying system, and Martin related some of his practical experiences with using solar energy in grain drying systems and presented slides of several systems in use.

All men agreed that using this method to dry grain is the most critical and no one should attempt it unless they know what they are doing. Martin also mentioned that a back-up system should also be available to anyone attempting to use solar energy. "When you need the solar energy the most is when the system is working the least efficiently," explained Steinhauer.

While reviewing the various ways grain is dried, McCurdy immediately eliminated the use of solar energy in high speed-high temperature grain drying. A collector the size of an acre would be needed for even a moderately sizes system, he said. This would be very expensive and a back-up source of heat or energy storage facility would be needed.

However, solar energy grain drying can be fitted into an in-storage drying system. Here, air flow is the key to the drying process. Low temperatures are maintained and the grain is either dried in layers or in full bins over a longer period of time, usually 4 to 10 weeks.

Safe storage time has to be watched carefully with this type of system however, cautioned McCurdy as he exhibited a chart showing various time intervals corn can be stored when it is at certain moisture levels and temperatures. At fifty degrees Fahrenheit, for example, corn at 22 per cent moisture can only be stored about 30 days before mold could be expected to start growing, but at 15 per cent moisture the corn could be safely stored for 492 days before there was any sign of mold.

In this type of system McCurdy advised the use of 1 cubic foot of air movement per minute for every bushel of corn at 20 per cent moisture. But accompanied with a small amount of heat, which could be derived from a solar energy system, the natural air flow could be reduced by 10 to 15 per cent.

A solar grain drying system of this nature where low temperature rises are used would only require simple inexpensive collectors. The grain would supply the energy storage for nights and cloudy days, McCurdy said.

Three types of solar energy collectors were described and shown from slides by the Penn State specialist. They included collectors built onto two-thirds or three-fourths of the bin sides, leaving the north side empty since the sun would not reach collectors there.

Placing collectors on the roofs of adjacent buildings such as a poultry house or machine shed and using the attic space as a collector was another method discussed. Here, the air from the attic is

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