

## HARVESTING AND STORING SOYBEANS

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Soybean losses frequently are 15 to 20 percent of the standing crop; the average is about 10 percent. But harvesting at the right time and keeping the combine adjusted keeps some of these losses to a minimum.

Proper combine setting is a *must*. Your best reference is the operator-owner manual supplied by the machine manufacturer. By applying this information to general field conditions and the moisture content of the soybeans, you can determine settings for a particular field.

Losses are small if harvest is completed before the bean's moisture content goes down to 10 percent. An Ohio study revealed that losses increase 1 percent per day after the moisture content drops below 10 percent.

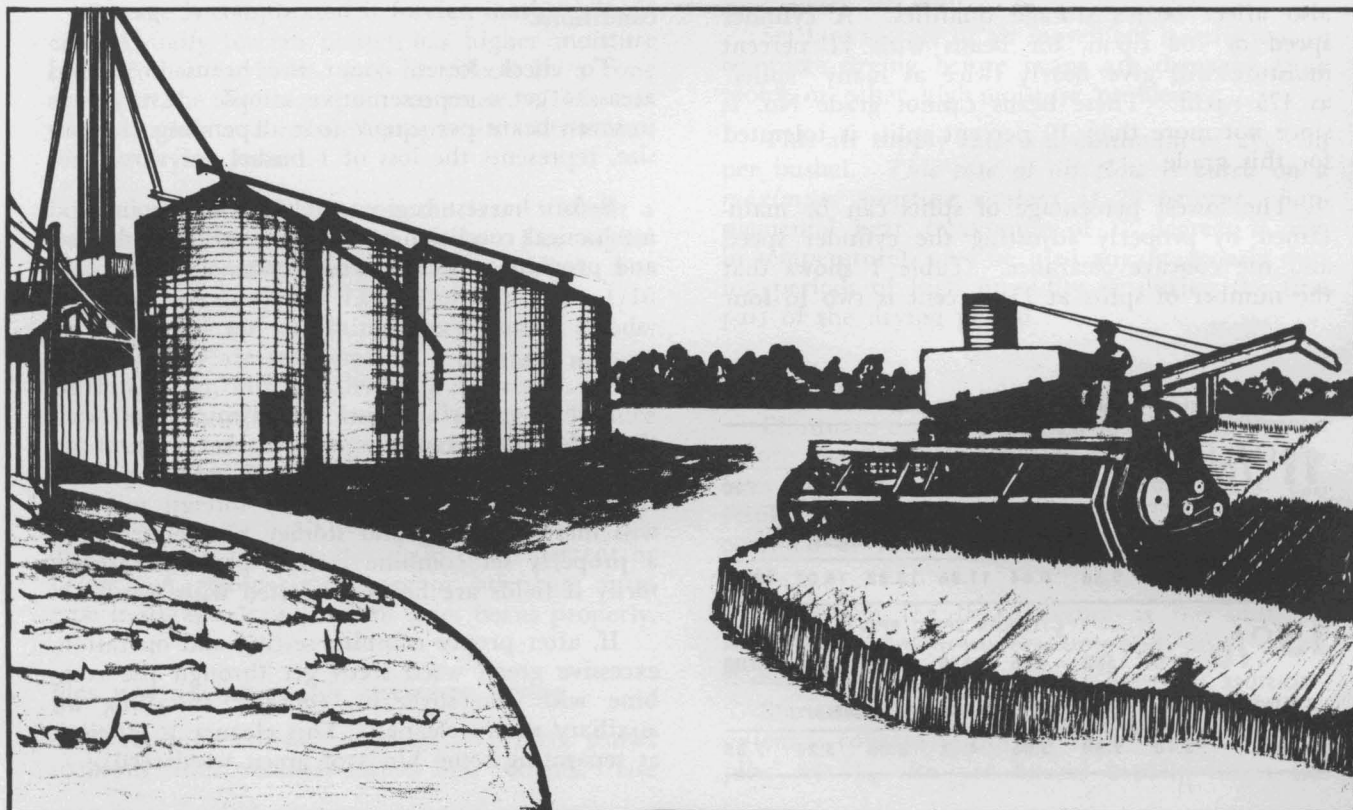
\*One-year test by Agricultural Engineering Research at Mississippi State University. (Do not use table as guide for setting combine. Use operator's manual plus field conditions.)

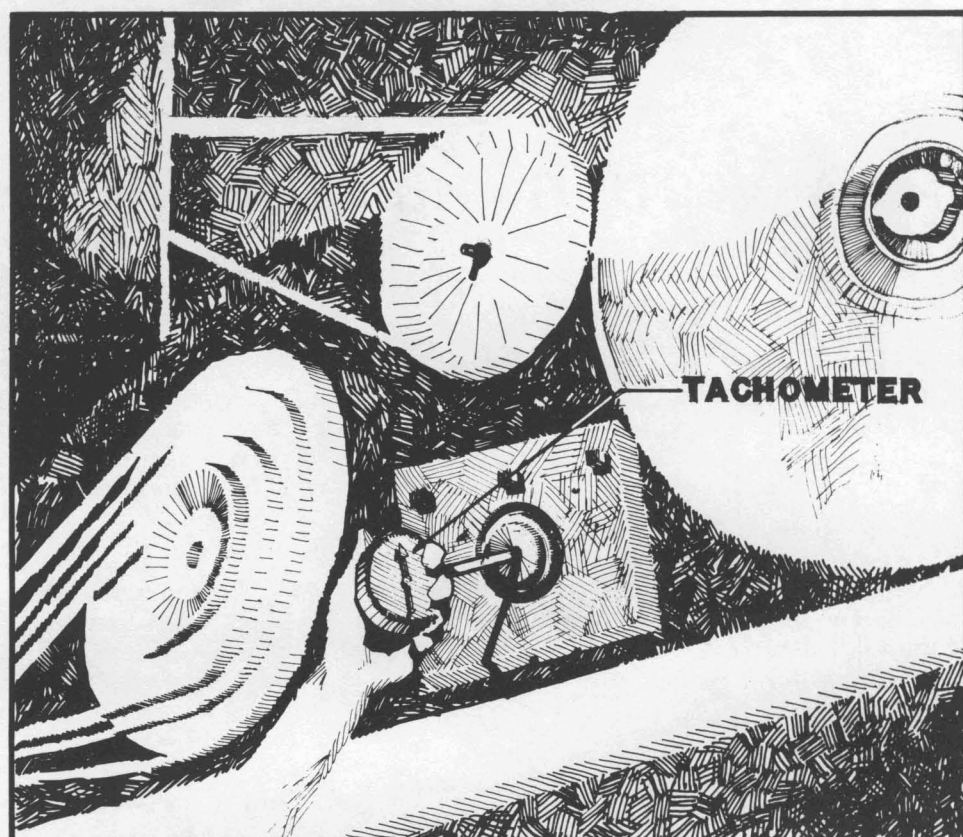
Moisture content of beans on the same plant frequently varies as much as 20 percent at harvest time, making it difficult to determine optimum harvest moisture content. Selecting an average harvest moisture content on the damp side rather than on the extremely dry side usually is safer *if drying facilities are available*.

Shattering usually causes the largest loss. The intensity of shattering depends primarily upon the moisture content of the pod and kernel. To minimize losses, harvest at moisture contents between 13 and 20 percent or in the early morning when the stalks are damp from dew.

### Proper Combine Settings

Slower forward speeds help reduce shattering losses. Dropping from 5 to 3 miles per hour can make as much as 8 percent difference in harvested crop yield.





## CHECK CYLINDER SPEED

Table 1 shows the effect of combine settings on "splits," which affect the price of soybeans. Splits also affect bean's storage qualities. A cylinder speed of 700 r.p.m. for beans with 11 percent moisture will give nearly twice as many "splits" as 475 r.p.m. These beans cannot grade No. 1, since not more than 10 percent splits is tolerated for this grade.

The lowest percentage of splits can be maintained by properly adjusting the cylinder speed and the concave clearance. Table 1 shows that the number of splits at 11 percent is two to four

times as great as at 13 percent for the same cylinder speed and concave clearance to fit field conditions.

To check losses, count the beans in several areas to get a representative sample. Every four to seven beans per square foot, depending on bean size, represents the loss of 1 bushel per acre.

Before harvest begins, put the combine in good mechanical condition. This saves beans and time, and provides a safer harvest season.

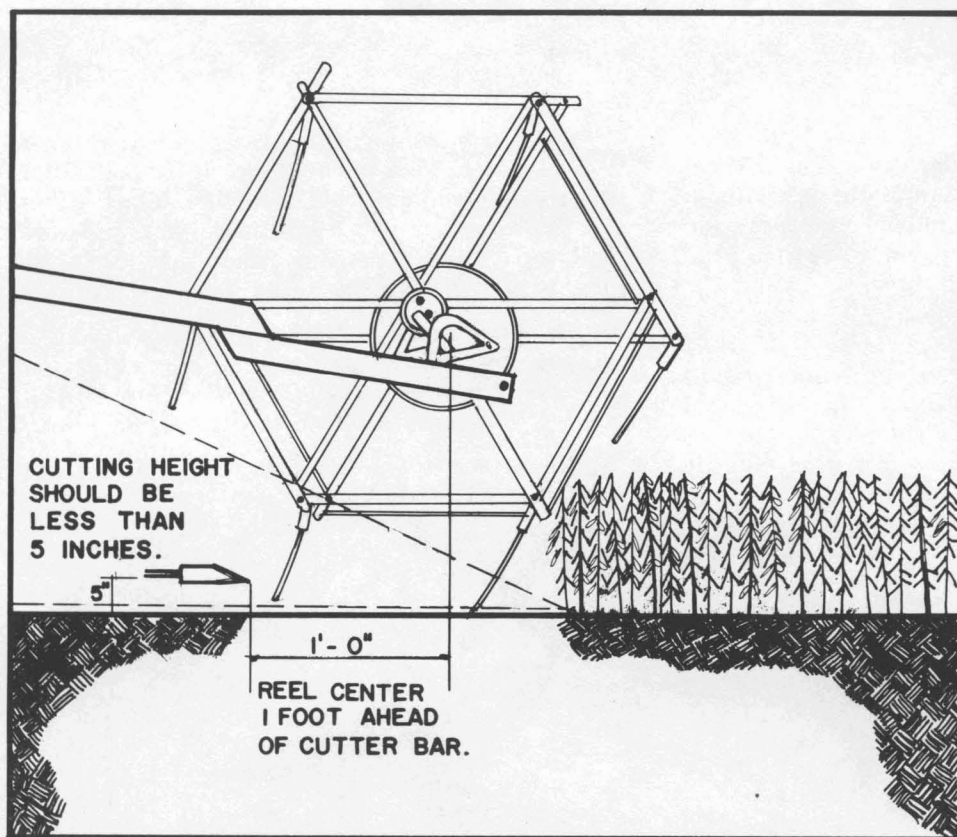
### Foreign Material

Foreign material (more than two percent) cuts the price of soybeans at the market even if all other factors are within limit. If beans are farm stored, a high concentration of foreign material will increase drying and storage problems. Even a properly set combine cannot perform satisfactorily if fields are heavily infested with weeds.

If, after proper combine setting and operation, excessive green weed seeds get through the combine with the soybeans, consider installing an auxiliary rotary cleaner. This cleaner is efficient at separating some kinds of green weed seed.

Table 1. Effects of combine settings on "splits"

11% MOISTURE CYLINDER CLEARANCE 3/8"	CYLINDER SPEED RPM						
	450	475	500	550	600	650	700
	PERCENT DAMAGE TO KERNELS						
	9.94	9.56	9.64	11.86	13.82	16.02	17.24
13% MOISTURE CYLINDER CLEARANCE 3/8"	CYLINDER SPEED RPM						
	450	500	525	550	600	650	700
	PERCENT DAMAGE TO KERNELS						
	2.18	2.38	3.06	4.11	5.06	5.29	7.38



## CHECK PICKUP REELS

### Storage

Storage is complicated if foreign matter is present. Usually foreign matter has higher moisture content than soybeans, and it collects in a cone shape at the loading spout entrance. This can cause heating and reduced proper air distribution for the drying system.

Do not store soybeans on the farm without a way to circulate air through them. The higher the moisture content, the more air is needed. For soybeans *not exceeding 13 percent moisture*, 1/10 cubic foot of air per minute per bushel is adequate if they are marketed in the spring. Operate fans when outside air is 10 degrees F. below the temperature of the beans in storage. Reduce bin temperature to approximately 50 degrees F. when possible.

Beans harvested above 13 percent moisture require high air flows to dry them to 13 percent or below. A commercial dryer or adequate farm type in-storage drying system dries beans properly.

### Bins and Equipment for In-storage Drying

A tight structure is essential to protect stored soybeans from weather, insects and rodents. Use

a system that will provide uniform air distribution throughout the bin.

Set fans so rate of air movement is sufficient to complete drying before beans are damaged from molds or other high-moisture problems.

This air supply rate is a minimum of 2½ cfm per bushel. *This rate of air flow is based on a maximum moisture content of 20 percent.* Supplemental heat (maximum of 12 degrees F. rise in temperature) may be used advantageously during periods of high humidity or during the first part of the drying period.

### Drying Procedure

Eliminate excessive foreign material or "trash" before in-storage drying. This material accumulates in pockets, causes air to channel and can result in musty and heat-damaged beans. The combine or re-cleaning procedures can eliminate trash.

Distribute the beans evenly as the bins are filled to prevent beans cracking and "trash" from accumulating in spots.

Start the fans soon after the air distribution system is covered uniformly with beans. Air supplied at 2½ cfm per bushel usually limits the



depth to a maximum of 8 to 10 feet for the most economical drying. Provide drying equipment with sufficient capacity to insure drying without loss in quality under different moisture and weather conditions encountered from year to year.

### Fan Operation

Push air through the beans continuously until the moisture content of the top 1 foot is reduced to about 15 percent. Then complete drying by pushing air through the beans *only* when outside relative humidity is 75 percent or less.

Take samples for a moisture content check at least twice a week during the drying operation. Probe at 8-foot intervals over the surface of the bin and draw samples from the bottom, mid-depth and top. Mix the beans from each level thoroughly and check moisture for each level.

*Low temperatures in beans during drying do not always indicate that the beans are in good condition. Therefore, samples pulled for moisture content also should be checked for mold growth.*

Keep records on fan operation and moisture content for each bin.

