COMBINE ADJUSTMENTS AND MAINTENANCE FOR HARVEST

Figure 1. A combine in a field ready to harvest corn.

Introduction

A combine is a complex machine that gathers, threshes, and cleans grain. Combines need to be properly equipped and adjusted for the crop to be harvested. Adjustments and maintenance are important to minimize harvest losses and deliver a high-quality grain crop. The goal of proper adjustments is to achieve a smooth, even flow of crop material moving through the combine. Start with the manufacturer's recommended settings and make adjustments according to the condition of the crop.

Safety and Maintenance

Always work safely around combine equipment and follow safety instructions in the operator's manual. Before harvest, follow the maintenance checklist provided by the manufacturer and inspect for any worn parts. Check the roller chains on a corn head or the knives on a cutterbar head for soybeans and small grains. In the threshing and separation area, check the rotor and concave for wear or damage. Check the condition of the sieves in the cleaning shoe area. Check for sharp edges on all augers which can lead to grain damage. Replace any worn parts as necessary for an efficient harvest.

Header Adjustments

The header is the first contact point with the crop and can be the largest source of grain loss. The combine header cuts and gathers the crop. On a corn header, gathering chains pull stalks back into the header, stripping rolls pull the stalks down, and deck plates pop ears off the stalks. Stripping roll spacing should be set according to stalk thickness. Deck plates need to be properly adjusted to minimize ear and kernel loss. Set deck plates as wide as possible without losing ears or shelling corn off the ear. Gathering chains pull ears into a cross auger that delivers them to the center of the head where they enter the feederhouse. Auger clearances must be properly set to work efficiently. When harvesting, it is important to match the feederhouse and corn head gathering speed to the combine drive speed. If the gathering speed is too slow, corn stalks entering the header will be pushed forward and ear loss can occur. If the gathering speed is too fast, ears can be damaged with kernel loss as they impact deck plates. Speed settings are correctly matched when stalks are pulled straight down after entering the header and ears are gently snapped off without damage. Watch for changes in crop and field conditions while harvesting and make adjustments accordingly.

Feederhouse Adjustments

The feederhouse is where the grain first enters the combine. Proper adjustments and settings need to be made according to the crop. It is important to set the proper height position of the feed drum to prevent grain damage. The feed accelerator should also be set at low speed so that whole ears are moved into the combine to start the threshing process. If the accelerator speed is set too fast, corn cobs can break apart and kernels can be lost before the threshing process begins.

Threshing Adjustments

Adjustments to threshing and separating parts of the combine are important for an efficient harvest. Threshing requires a balance between rotor speed and concave clearance. The cylinder or rotor speed is the leading cause of grain damage by the combine. Use the lowest possible rotor speed that will shell the grain. When setting the rotor speed and concave clearance, begin with factory recommended settings as a starting point and fine-tune for the crop and field conditions. A properly adjusted rotor speed and concave clearance will detach most of the grain from the cob. If the rotor speed is too fast, corn ears will break apart and kernel damage can occur resulting in cracked grains and fines entering the grain tank. If the concave clearance is too wide, complete threshing will not occur and similar results as excessive rotor speed will occur with lots of split cobs showing up in the tank. For good threshing and separation, follow these guidelines:

- Keep the rotor chamber full to minimize harsh grain contact,
- Keep rotor speeds as low as possible for proper threshing to occur,
- Close the concave spacing to increase threshing capability, and
- Only increase the rotor speed as a last resort.

Grain Cleaning Adjustments

After threshing, the grain is separated from the non-grain crop material by the chaffer and shoe sieves and the cleaning fan. The chaffer is the upper sieve that allows all grain and un-threshed cobs or pods through to the shoe sieves which allows only grain to pass. Un-threshed crop portions go into tailings and return to the rotor cage for re-threshing. Sieve and fan settings are critical to deliver a clean, high-quality end product and should be set to specifications. If the fan speed is too low, you will see pieces of stalks and cobs in the grain tank. If the fan speed is too high, you can lose grain out the back of the combine. Sieve adjustments should work in tandem with fan speed for best results.

Summary

Modern combines are being engineered to automate and make the adjustments easier to do, but it still does not alleviate the need for operators to make adjustments according to field and crop conditions. It is generally recommended to make only one adjustment at a time before making another and making them in small increments. Further adjustments are generally necessary while harvesting when field and crop conditions change, such as grain moisture content. Monitor losses behind the combine and grain quality in the grain tank throughout the day while harvesting. Always refer to the owner's manual for complete information for combine maintenance and adjustments.

Sources

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Web sources verified 08/07/20.

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