

## HOW DIFFERENT TILLAGE TOOLS IMPACT THE SEEDBED FLOOR

### Finish Fields Right for A Fast Start



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When you pull into a field with your planter and look across the piece of ground — maybe while the planter unfolds — it's important to feel good about what you see. The surface looks smooth. Clods and residue are consistently sized and evenly distributed. But it's how the field got to that point that matters most.

To be sure, regardless of implement, each tillage pass contributes to final seedbed conditions. But the implement used just before planting creates the final seedbed you're planting into. Most important: That tillage tool sets the seedbed floor where your planter's row units ride and where they will place the seed. Have you created a high-efficiency seedbed?

In a perfect world, the planter rides on a consistent, level seedbed floor. This leads to a smooth planter ride, even seed placement and uniform emergence. And, because the seedbed sets your planter's speed limit, a high-efficiency seedbed is what allows for high-speed planting.

In many fields, however, the seedbed floor is not perfectly even. A gouged, rough,

inconsistent seedbed floor can be a result of several factors:

- *Soil too wet*
- *Misadjusted tillage equipment*
- *Incorrect operating speed*
- *Tillage implements ill-suited for final seedbed prep*

A rough seedbed floor can make the planter row unit bounce, causing uneven seed placement or skips. Misadjusted tillage equipment — improper leveling across the width of the tool, for example — or properly adjusted equipment operated at the wrong speed<sup>1</sup> can lead to variations in soil moisture and temperature. Changes in soil density can result in poor seed-to-soil contact and hinder root development.

Alone or in combination, any of these factors can lead to nonuniform emergence



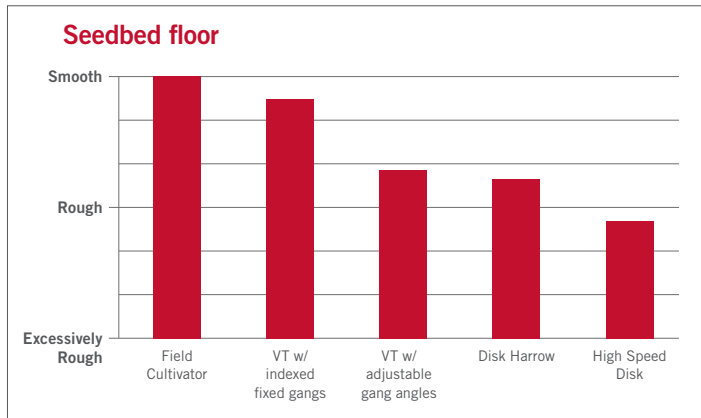
and poor crop development that limits yield potential. Understanding how different tillage tools impact the seedbed floor and, ultimately, yield can help you more consistently achieve a high-efficiency seedbed. This insight also helps reveal how Case IH Advanced Farming Systems (AFS) and the technology behind AFS Soil Command™ seedbed sensing can allow for real-time, yield-enhancing adjustments during final seedbed preparation.

### Identifying a High-efficiency Seedbed.

On the surface, the perfect seedbed is level, adequately firm and covered with small clods or a light mulch of crop residue to protect against soil erosion. Below ground, the seedbed floor is the narrow layer between worked and unworked soil where your planter row units ride and place the seed. When created with the right tillage tool that's properly adjusted, the seedbed floor should be even more level, smooth and consistent than the field surface. Look for moisture throughout the seedbed depth and a soil profile that is well-mixed, providing the right soil-air-water balance for optimal seedling development.

# EQUIPMENT TO CREATE A HIGH-EFFICIENCY SEEDBED.

Different tillage tools can adequately achieve certain components of a high-efficiency seedbed. But Case IH agronomist field tests prove a field cultivator does the best job of bringing together all the elements and is the most commonly used implement for the final tillage pass before planting. However, a field cultivator is not a fit for every farming operation. It is helpful to understand how different tools can impact seedbed preparation, particularly the creation of a smooth, consistent seedbed floor:



Seedbed floor quality for varying tillage tools

## In-line and Disk Ripper, Chisel Plow.

Primary tillage tool; excellent for managing crop residue, breaking up compaction (rippers only) and advancing fields toward a high-efficiency seedbed

- Ideally followed by a secondary tillage tool, such as a field cultivator, for final seedbed preparation
- Ensure proper settings and adjustments when using to create final seedbed ahead of planting
- Properly sizes clods (less than 6 inches in diameter) and residue (shorter than 18 inches) to set the stage for a more effective and efficient spring tillage pass

## Disk Harrow.

A disk harrow is an excellent soil and residue management tool. They effectively slice through residue, uproots root balls and helps level the soil surface. Often used as a fall tool but can also be an effective spring seedbed preparation tool.



- Individual disk blades can leave behind underground ridges
- Improperly matching gang angle to blade concavity can result in back-side disk blade pressure that can create soil density and firmness variances across the width of the tool
- Proper disk design, setting and adjustments are critical to creating a smooth and consistent seedbed floor
- Blade spacing wider than 9 inches makes creating a perfectly flat seedbed floor more difficult
- Planting at a slower speed in the same direction as — instead of at an angle or perpendicular to — can help improve planter row unit ride

## Vertical Tillage Tool.

Vertical Tillage is shallow and fast tillage pass that promotes residue management. They effectively slice through residue, in some cases mix soil with the residue and level the soil surface. Is used in both fall or spring.



Seedbed floor created with fixed gang angle vertical tillage tool



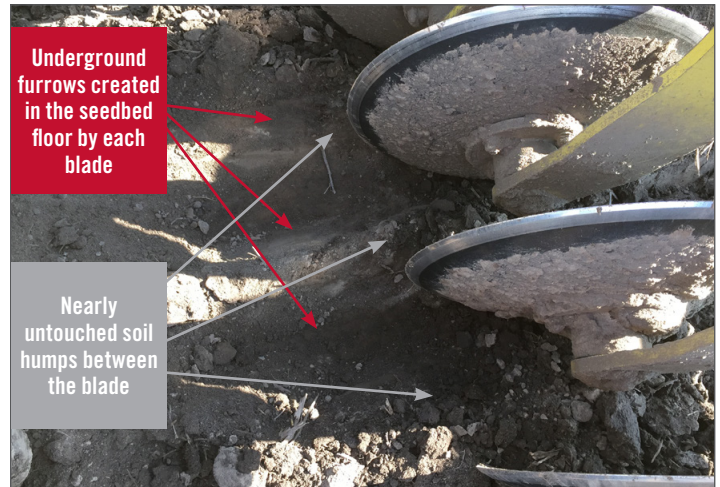
Seedbed floor created with fixed 18-degree gang angle vertical tillage tool

- Individual disk blades can leave behind underground ridges
- Improperly matching gang angle to blade concavity can result in back-side disk blade pressure that can create soil density and firmness variances across the width of the tool
- Proper disk design, settings and adjustments are critical to creating a smooth and consistent seedbed floor
  - Fixed gang angle (tools with adjustable gang angles not likely to create a flat seedbed floor)
  - Front and rear gangs indexed to each other so they work together to shear a flat seedbed floor
  - Higher speeds often required
  - Must have walking tandems and stabilizer wheels to maintain a smooth operating frame
  - Fore/aft leveling required
  - Must maintain wing-to-main-frame levelness

## Emerging Trend: High-speed Disk.

High-speed disks have received considerable attention in recent years. They manage residue, cover a lot of acres quickly and create a seedbed that looks good — on the surface. But what you can't see is a seedbed floor that is rough and inconsistent.

- Blade spacing typically is too wide and front/rear gangs are not indexed, making a flat seedbed floor unlikely
- Independent blades easily start walking; blade depth is inconsistent during operation



Seedbed floor created with high-speed disk

These tillage tools are heavy, resulting in much higher blade pressure than traditional disks or vertical tillage implements.

This weight and horizontal soil movement often creates a soil density layer that, much like a compaction layer:

- Impedes proper root growth and development
- Can prevent water infiltration
- Creates seed placement issues
- Leaves residue in the seed zone, where it can interfere with germination, emergence and plant development



Resulting soil density layer inhibits proper root penetration and development

## Field Cultivator.



Seedbed floor created with a field cultivator

A field cultivator is widely recognized as the best choice for final seedbed preparation.<sup>2</sup>

- *Shanks are able to work independently, yet provide 100% coverage so every square inch of the seedbed floor is conditioned and made flat*
- *Proper settings and adjustments are critical for successful creation of a flat seedbed floor:*
  - *Fore/aft leveling*
  - *Leveling of wings to main frame*
  - *Must have walking tandems and stabilizer wheels for a smooth operating frame*
  - *Optimal shank holding force allows for higher speeds while still creating a flat seedbed floor*

This environment allows for consistent seed placement and optimal seed-to-soil contact for fast, uniform germination and emergence.

## Technology Can Help.

In conjunction with the Tiger-Mate™ 255, Case IH AFS Soil Command™ provides the first seedbed monitoring technology that allows you to measure and optimize the agronomic quality of your seedbed — right from the tractor cab. This advanced technology monitors the quality of the seedbed with sensors strategically mounted to shank assemblies throughout the machine. Each time the shank begins to trip or float, the sensors deliver real-time feedback to the operator in the cab, allowing the operator to fine-tune adjustments to match field conditions.

<sup>1</sup> Parli, B. (2016). Soil Management Plots.

<sup>2</sup> DeJong-Hughes J, Daigh A. Tillage implements, purpose and ideal use. University of Minnesota Extension website. <http://www.extension.umn.edu/agriculture/soils/tillage/tillage-guide-implements/#shallow>. Published 2017. Accessed May 21, 2018.