exapta solutions, inc.

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THE LEADER IN NO-TILL SEEDING TECHNOLOGY

No-Till Planter Preparation

by Matt Hagny

Corn planting season is fast approaching for much of North America's Corn Belt, and many planters are now in the shop for overhauls, so a quick review of some essentials seems appropriate:

1) Check opener blades. Once they've lost 3/8-inch off their diameter, they've lost their bevel and no longer cut residues (or soil) readily. If you continue to run the blades for a long time, eventually they get worn so thin that they are sharp again (razor sharp), but this thinness causes huge problems with blade flex and furrows that are pinched slits so narrow that a corn kernel cannot get to the bottom.

For replacement blades, use the 3.5 mm instead of 3.0. Also, Deere now offers a double-row bearing and hub that reduce flex even more (brg + hub + blade is part # AA65457; to fit shanks prior to the XP, a nut AA66947 is required, which lets this configuration fit all 7000, 7200, and early 1700-series row units).

2) Check seed tube guards. If they've worn much off of their 15/16-inch original dimension, replace them. Having a guard that is full-width or nearly full-width is crucial for creating a furrow bottom that is consistently wide enough to install a corn kernel; *blade flex causes erratic depth, and worn guards are a major contributor to blade flex*. Seriously consider going to R-K Products' hardened guard, now redesigned to be even more trouble-free (floating wear pads are eliminated; it is a one-piece welded unit now). Stay away from any inserts or guard replacements that protrude below the blades—these smear the bottom of the furrow terribly.

3) For the R-K guard, shim the blades so they lightly contact the guard. The 3.5-mm blades will only have 0.5 to 1.5 inches of contact area at the front (this is the measurement taken by sliding pieces of paper or business cards into the blade juncture from the top and bottom; the old rule-of-thumb for 3.0-mm blades was 2.5 inches of contact area—ignore this for 3.5-mm blades).

4) Eliminate slop in the gauge wheel's pivot point. We recommend R-K Products' permanent repair kit. www.rkproducts.com or ph. 800-580-6818.

5) Re-evaluate how you achieve seed-to-soil contact. If you've had problems with Keetons in the past, or heard of troubles and got worried, reconsider them in combination with the Mojo Wire from Exapta. The Mojo Wire eliminates most of the mud accumulation problems that have occurred

New on Exapta's website: For your ordering convenience, all products and components are now pictured, along with part numbers and pricing.
www.exapta.com

No-Till Seeding Explained™ DVD
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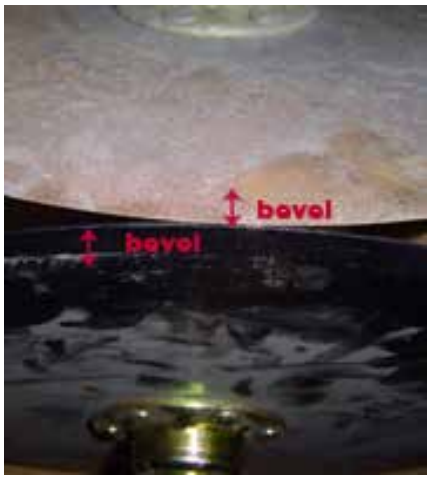


For best cutting performance (both residue and soil), replace opener blades when bevel is half gone

in the past, and this is especially true in low-disturbance no-till. If you cut a crisply defined furrow in a structured no-till soil, the Keeton shape 'fills' the furrow and wipes its lower edges clean *so long as it has sufficient pressure* to hold itself down in the furrow. A crisply defined furrow is the normal result of a well-adjusted planter in true no-till soils except when cutting coulters or RID gauge tires are used, or if fertilizer side-band openers are operating too close to the row unit.

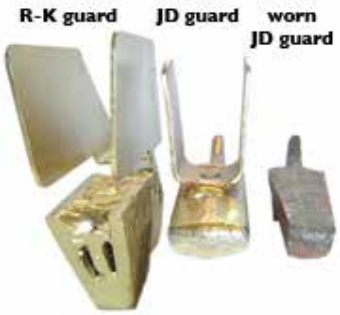
Because of the increased pressure from the Mojo Wire, Keeton wear is accelerated—but at least it's doing its job! (If it didn't supply any seed-to-soil contact, it would never wear out. But it wouldn't do any good either, other than slightly reducing seed bounce.) Because of faster wear on the Keeton tail, Mojo Wires aren't intended for use with Low-Profile (LP) Keeton models—they would wear out unacceptably quickly. Fortunately, there's not much reason to want the Low-Profile models once you've seen the mud-cleaning action created by the Mojo Wire (especially in combination with a crisply defined furrow in no-till).

A pernicious rumor over the years is that Keetons can drag seed. I've been looking for 15 years, and have never seen it—and I've studied it extensively on a wide variety of planters and soil types. Indeed, I simply cannot imagine how it would ever occur, except perhaps in a very specific set of circumstances involving: A) the Keeton having essentially no pressure on the tail, B) mucky wet high-clay soil, and C) loose unstructured soil (tilled seedbed). Basically what would need to occur would be an accumulation of mud on the underside of the Keeton—and this would never occur if the Keeton had sufficient pressure, either because it was new and had the tensioning screw set at maximum, or because it had a Mojo Wire installed.

6) Can you have too much seed firming from a Keeton or seed-lock wheel? For all practical purposes: 'No.' Using a blunt object such as a Keeton or seed-lock wheel, you will never push the seed deeper than the opener blades have cut—you will embed the seed in the bottom of that cut (which is desirable), but it would be impossible to push the seed deeper than that (if it were otherwise, why would we need sharp opener blades?). From everything I've seen, doing more seed firming: A) improves the percent of seeds germinating and establishing (without a rain), B) speeds the germination process, and, C) results in greater uniformity of emergence timing.

Occasionally we hear of 'experts' who state that Keetons should have 1.0 lb of pressure on the tails, as determined by a fish scale (presumably with the tail in normal operating position). So far as I can determine, there have never been any scientific studies conducted whereby this was determined to be the 'optimum.' And if some studies were actually done, could we please be informed of the soil type (particularly texture, organic matter content, and moisture level) as well as confirming that these were conducted in no-till? As I've long stated, the pressure needed for seed firming will be proportional to what is needed to maintain depth with the row unit (mellow glaciated soils will need less down-pressure on the row unit, and less tension on the Keeton, as compared to the low-OM soils of the southern USA, or as compared to dry soils anywhere).

Experiences with JD 50/60/90-series drills outfitted with narrow firming wheels also indicate that seed firming pressures that are relatively high can be quite useful in many cases. For instance, the in-furrow firming wheel arm & spring on that drill model can apply ~ 20 lbs of pressure to a wheel with a surface area on the furrow bottom that is quite similar in size to a Keeton. So, rest assured that the ~ 5 lbs of pressure achieved with a Mojo Wire on a Keeton



RK Products' hardened seed tube guards are a tremendous improvement over OEM for both durability and functionality.

A severely worn OEM seed tube guard. Note that the sides have worn in an arc due to blade flex.

Demonstration of how the soil causes blades to flex in hard against the seed tube guard. (No, this wasn't a champion weightlifter pinching the blades.)

The furrow will have a flat bottom if blade flex is minimized. Seed depth is much more consistent if blade flex is minimized.

is in no way excessive as far as the seed is concerned. (We sometimes hear concerns about cracking seeds such as soybeans or sunflowers with a Keeton + Mojo; I've never seen that either, and if the soil were that hard I doubt the opener would penetrate anyway.)

7) Closing wheel choice partly dictates seed firming requirements. If you are running 2 spoked closing wheels per row (which is ideal for root development) and those closing wheels are designs that do little or no pressing of the soil (which is good), then you must do seed firming with a Keeton (or a seed-lock wheel). *Remember, a Rebounder doesn't do any seed firming.*

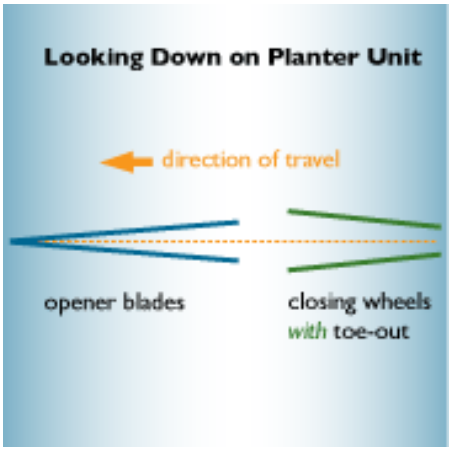
Spoked closing wheels that don't pack the soil would be Exapta's Thompson wheel, the Martin Spader wheel, etc. Closing wheels that perform significant packing include: Dawn Curvetine, Martin Dimple, and Needham's 20-point Crumbler. While the manufacturer recommendations may not be perfectly consistent (or clearly defined), the general message is that in-furrow seed firming is preferred (or at least not discouraged) with all of these, but in-furrow firming is quite necessary for the spoked closing wheels which don't do any packing.

8) Be gentle with furrow closing. Packing the soil over the seed is a concept left over from the tillage era, when that was your seed-to-soil contact and soils were loose and dry. If you perform in-furrow seed firming, now the option exists to gently close by slicing and crumbling the soil instead of smashing it with pressure. Squeezing the furrow with lots of pressure on blunt objects (OEM smooth closing wheels, thick tines, etc.) results in more crusting, reduced oxygen exchange, slower germination, and more physical resistance encountered by the seedling as it pushes to the surface. I'd rather have the furrow occasionally open or partly open rather than do lots of packing or compressing to get it closed. If mulch in the field is adequate, and if seed firming is sufficient at the seed's location, then the seed usually will germinate and establish just fine despite a furrow that is partly (or completely) open—the exceptions would be if it is hot and windy, such as is often the case for milo planting or other plantings during very warm times of the year, or if the field lacks mulch cover. At normal planting dates (temperatures) for corn, partially open furrows aren't a major problem, or at least not enough of a problem to warrant a great deal of additional packing of the soil over the seed to try to obtain complete closure (if soils are clayey, they will crack open as they dry anyway).

9) Is one spoked closing wheel per row sufficient? I understand perfectly the need to be frugal, but using only one spoked closing wheel per row is often inadequate. The reason, quite simply, is that you need roots growing relatively normally in *both* directions outward from the row. Planters use double-disc openers that pry the soil outward in both directions, and slicken both sides of the furrow. So you really need to break up both of those sidewalls.

The idea of using only one spoked closing wheel per row has been put forth primarily by one or two closing wheel manufacturers (not Exapta). In the one case, the closing wheel in question has a very long slender spoke (nearly 2.5 inches long), with a tendency to go too deep and pull seeds loose when two of these wheels were used per row. The solution was to use only one spiked wheel per row and to keep the OEM smooth wheel on the opposite side of the closing bracket—that way the smooth wheel prevented the spiked wheel from going too deep (the spiked wheel was slightly larger diameter than the OEM smooth closing wheel). *But the source of the problem was a wheel with*

Keeton with Mojo Wire supplies up to 5x the pressure of a standard Keeton, for fast, uniform germination and emergence. Try to embed the seed in the bottom of the furrow, just like a 'seed-lock' wheel would do.



If more closing action is needed, regardless of brand or design of spoked closing wheel, try Exapta's toe-out wedges, which help the wheels gather soil and actively pull it into the furrow. Closing wheels work best with toe-out, since it's simply the reverse of the opener blades prying soil outward.

Spoked closing wheels have a smaller footprint than OEM smooth wheels, and need far less down-pressure. A lighter spring in the closing bracket gives you more adjustment range.

spokes of an inappropriate shape and length; a well-designed spoked closing wheel will have shorter spokes and tapering sides of the spoke so that its depth is self-limiting.

If you're unconvinced, try setting up one row of your planter with two spoked closing wheels per row (of a good design, and with a functional Keeton on that row) and observe the root growth yourself during the season. Many years, having the sidewall fractured on both sides provides a significant advantage versus only fracturing it on a single side.

10) For many years (ca. 1994 – 2000), I had no opinion at all on RID gauge tires on JD/Kinze/White planters; the idea made some sense, but I had no experience with it. After one client had significant problems and I did some investigation, the deficits became quite apparent in the use of RID gauge tires on those planters. This has been confirmed many times, by many people. Frankly, I'm amazed at how many people will tell me privately about the serious problems they've had with RID gauge tires (they tend not to be public about their observations, because it goes against what is touted by some 'experts'). Most of these people were trying mightily to make the RID tires work, but they eventually discovered a different reality, and the geography ranges from the Dakotas to Oklahoma and Missouri, to the better soils of the Corn Belt. Recently I was in Ontario at a conference, and I did a bit of a survey of no-till and reduced-till producers, and it seems that they have had plenty of disasters with RID gauge tires as well (far more disasters than successes).

I've not been so convinced that RID tires actually reduce compaction so much as they cause (allow) more sidewall disruption that creates the illusion of less compaction. (Note that well-designed spoked closing wheels can perform sidewall disruption equally well.) Reasons for the statement about compaction: A) much of the compaction is due to the blades pushing outward, which doesn't change, and B) most of the weight being carried on the gauge tire is on the outer edge anyway (they are tipped from vertical to be parallel to the blades).

A side note is that the new AirForce system (from Precision Planting) for regulating the down-pressure on the row unit may very well eliminate any further worry about compaction from gauge wheels, since the weight being carried by the wheel could be maintained at a constant (minimal) amount.

If the planter is running even slightly nose-down, the angle of the closing bracket is altered, which creates toe-in: the closing wheels will then work very poorly because they are actually pushing soil away from the furrow.

Remember, you want relatively loose soil over the seed. Packing the soil over the seed is a concept leftover from the tillage era. Heavy closing wheels and thick tines or spokes will do too much packing.

After exiting the seed tube, it is only the furrow sidewall that guides the seeds into the bottom of the furrow. The seed tube ends a full 2 inches above the bottom of the furrow.

RID gauge tires allow sidewalls to lift (follow the blades upward) which creates the illusion of less compaction, as well as making furrow closing easier. However, the potential for misplaced seeds is significantly greater.